Appendix I

Chapter 1.0
Appendices

Data Collection and Analysis for Generating Procedure-Specific Practice Expense Estimates (HCFA Contract No. 500-95-0009)

April 30, 1997

Prepared for
Health Care Financing Administration
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Data Collection and Analysis for Generating Procedure-Specific Practice Expense Estimates

HCFA Contract No. 500-95-0009

Briefing Paper #1

Summary of Technical Approach

May 24, 1995

Abt Associates Inc.

Prepared by Abt Associates Inc.

1.0 INTRODUCTION

The Social Security Act Amendments of 1994 mandate that the Secretary of Health and Human Services "must develop a methodology for implementing in 1998 a resource-based system for determining practice expense relative value units for each physician service" covered by the Medicare Fee Schedule (MFS). Medicare reimbursement for physician services consists of three components: physician work, practice expenses, and malpractice insurance costs. These components are assigned relative value units, which are summed and multiplied by an appropriate conversion factor, after each being deflated by a Geographic Adjustment Factor (GAF), to derive the total payment for a service. In 1992, the Health Care Financing Administration (HCFA) began phasing in the Medicare Fee Schedule. This system replaced the prior method of compensating physician work based on prevailing, reasonable and customary charges, which may not have accurately reflected the resources required to provide physician services. Now, under Congressional mandate, HCFA is extending the resource-based payment approach to the practice-expense portion of the fee schedule. The Agency has engaged Abt Associates Inc. to conduct a study to assist it in collecting and analyzing data that can be used in developing resource-based practice-expense relative values for the approximately 8,500 codes defined in the Current Procedural Terminology (CPT), as well as alpha-numeric HCPCS services, contained in the MFS. Where appropriate, both technical and professional component values will be determined. In addition, the data may allow for the refinement of current site-of-service payment differentials.

This project is intended to achieve two primary goals. The first is to construct a database containing both direct and indirect practice expense estimates (by site-of-service) for all services reimbursed under the Medicare Fee Schedule. Next spring, HCFA intends to award multiple contracts to further analyze the data that will be collected under this current study. This database will be designed to enable other health services researchers to test alternative methods for estimating practice costs per service and to support simulations of the effect of a resource-based system on a variety of practice types and specialties. Ultimately, the final determination of relative values for practice expenses will be made by HCFA after inviting public comment in a Notice of Proposed Rulemaking that is expected to be published in early 1997. The second goal

is to analyze these data to develop cost estimates for procedures, taking into account the direct and indirect practice costs associated with providing the full range of Medicare-covered physician services delivered in the physician's office and other settings (e.g. hospital, ambulatory surgery center, etc.).

1.1 PROJECT TEAM

The project team, which has been assembled to collaborate with HCFA to accomplish these goals, has extensive experience in physician payment issues. The team will rely on key individuals at Abt, the University of Pennsylvania, the Center for Research in Ambulatory Health Care Administration (CRAHCA), and Entermedica Resources as outlined below:

- ***Monica Noether, Ph.D., Principal Investigator.*** Dr. Noether, a nationally recognized leader in Medicare Fee Schedule and physician practice expense issues, will lead all project activities. She will be supported by senior health economists and skilled analysts at Abt, all of whom have experience assessing physician practice expenses and convening physician panels.

- ***Abt Associates In-House Survey Capabilities.*** Abt's in-house survey staff will coordinate a practice-specific mail survey (to be distributed to several thousand physician practices).

- ***Mark Pauly, Ph.D. and Gerard Wedig, Ph.D.*** Drs. Pauly and Wedig are health economists from the Leonard Davis Institute of Health Economics at the University of Pennsylvania. They will collaborate with Abt as consultants in the overall research design, with specific responsibility for the methodology and analysis of indirect cost allocation.

- ***Sankey Williams, M.D., and José Escarce, M.D., A.M.,*** Also from the University of Pennsylvania Hospital, these two clinicians will collaborate with Abt as consultants, providing important *clinical* input into the research design.

- ***William Katz, D.B.A.,*** Dr. Katz is a health care management consultant and former director of the health care management and finance practice at Arthur D. Little, Inc. He brings to the project in-depth knowledge of the organization and management of both medical group practices and small (one and two) physician practices. His experience will be particularly important in tasks related to identifying the appropriate prices to assign to inputs which are used in providing specific services.

- ***Center for Research in Ambulatory Health Care Administration (CRAHCA).*** The research arm of the Medical Group Management Association (MGMA) will provide expertise in physician practice survey development activities and identification of potential CPEP members.

- ***EnterMedica Resources.*** Experts in both the accrual reporting methods of financial accounting for physician practices and in procedure-specific cost measurement, EnterMedica will apply their expertise to ensure that meaningful financial accounting data are obtained in the survey and that these data are "translated" into consistent and reliable cost estimates.

Abt and HCFA staff understand that development of a resource-based approach to practice expense reimbursement will involve many complex data collection and analytic issues. Therefore, the project will also involve the provider community directly in the development of the new payment system. ***Clinical Practice Expert Panels (CPEPs)***, composed of physicians, practice administrators, and other clinical staff, will be organized to help develop consensus estimates of the resources ("resource profiles") required in providing medical services. In addition, a ***Technical Expert Group (TEG)***, composed of researchers and other experts on the Medicare Fee Schedule and physician practice expenses, as well as members of the medical community representing both clinical (e.g., physicians, nurses) and administrative (e.g., practice administrators, office managers) personnel, will be convened to advise HCFA and Abt staff on all phases of the project. Most importantly, the TEG will provide oversight and technical input into the data collection and analytic strategies to ensure that the data can be used by other researchers in assessing alternative cost estimation strategies.

1.2 RESEARCH METHODOLOGY

Abt proposes to use a hybrid approach, employing both accounting and econometric analytic tools, to collect and analyze cost data on both a service- and practice-specific level. The CPEPs will be convened to help determine the direct inputs associated with providing specific services at different sites. These panels will identify the relevant set of direct inputs (e.g. clinical staff time, medical supplies and equipment) which are required in the provision of a particular service. In addition, a mail survey of a random sample of physician practices will obtain direct

and indirect costs and the case-mix (distribution and volume of services) of the practices. The main purpose of this practice-specific survey will be to compile data on aggregate costs so that indirect costs can be allocated to individual services.

The primary components of the research approach are described briefly below.

1.2.1 Data Collection

- **Conduct Survey to Collect Practice-Level Costs.** A self-administered (mailed) survey of physician practices will be sent to several thousand medical practices to solicit data on aggregate indirect and direct costs, case-mix, and practice characteristics.

- **Convene Clinical Practice Expert Panels (CPEP) to Obtain Procedure-Specific Resource Profiles.** The approximately 8,500 CPT codes, as well as HCPCS services, contained in the MFS will be classified into groups or "families" of service codes that are clinically related and have comparable direct costs. Approximately 12-15 CPEPs will then be formed and assigned to the different service groupings. The CPEPs will select "reference services" from these groups and will determine the clinical resources (resource profiles) required for each reference service.

- **Compile Direct Cost Data.** Direct input prices (clinical wages, medical supply costs) will be gathered from various sources, including, but not limited to, the practice-specific survey and national secondary sources. The prices will be applied to the reference service resource profiles to generate direct cost estimates for these services. In addition, information on capital costs and reasonable utilization rates will be assembled.

1.2.2 Database Construction

- **Design Research Database.** Public access data files, containing the data collected from the surveys, CPEPs, and research on input prices, will be created to enable other researchers to assess alternative techniques for calculating service-specific practice expense estimates.

1.2.3 Data Analysis

- **Extrapolate Direct Costs.** Direct costs for the reference service from each service family will be extrapolated to the other codes in the group, based on "adjustment factors" developed by the CPEPs that represent the ratio of the direct costs for each

service in the group to the direct costs for the reference service. The data pertaining to this extrapolation process will be added to the research database.

- **Allocate Indirect Costs.** Total indirect costs for each surveyed practice will be allocated to the specific services provided by the practice. A variety of alternative approaches will be assessed to determine the ability of each methodology to achieve the objectives of the resource-based payment reform. In addition, the redistributional effects across practice types and specialties of each methodology will be measured. Results of Abt's analyses of different allocation strategies will also be incorporated into the research database.

- **Validate Cost Estimates.** The CPEPs will perform a "final face-validity check" on the total service-specific cost estimates to ensure that they accurately reflect the resources required in providing physician services.

- **Perform Impact Analysis.** The impact of resource-based payments on different practice types of varying practice size, specialty composition, and geographic region will be explored.

Exhibit 1-1 demonstrates how each of these steps will be combined to develop service-specific practice cost estimates. Each of these components is described in further detail below.

2.0 DATA COLLECTION

Three distinct data collection activities will be undertaken. First, a self-administered (mail) survey of practice costs will be conducted for the primary purpose of collecting data on the total indirect costs and case-mix of practices, as well as information on practice characteristics that may explain any variation in these costs. Second, Clinical Practice Expert Panels (CPEPs) will be convened to complete resource profiles of the direct inputs used in providing particular medical services. Finally, prices for these direct inputs will be obtained from national secondary sources, as well as group purchasing organizations, and equipment and supply manufacturers. As will be explained below, these prices will be combined with the resource profiles developed by the CPEPs to generate direct cost estimates for specific physician services.

2.1 SURVEY OF PRACTICE COSTS

A survey of medical practices will be designed and implemented to collect practice-level cost data, focusing specifically on the total indirect costs and case-mix of the sampled practices. Data on aggregate direct costs and background practice information will also be solicited. The proposed design of the survey, sampling plan, and survey administration is described below.

2.1.1 Instrument Development

To capture effectively the data elements necessary for analyzing the costs associated with operating physician practices of various types, Abt has developed a preliminary survey instrument which requests information relating to the following aspects of physician practices: 1) Direct Patient Care Costs; 2) Indirect Practice Costs; 3) Practice Characteristics; and 4) Case-Mix Data. The survey has been divided into these four sections as outlined below:

> **Direct Patient Care Costs:** Direct patient care costs are those expenses which are easily and unambiguously attributable to the *provision of a particular service*. Salaries of all non-physician clinical staff who assist in rendering services, medical supply costs, and the purchase and maintenance costs of medical equipment used in providing services will be identified as direct cost items. In developing the final survey instrument, it will be necessary to finalize which components of total practice expenses may be defined as direct.[1] The TEG, HCFA, and consultants to the project will provide important input on this task. Once a suitable definition of direct costs has been determined, it will be incorporated into the survey with sampled practices being asked to report their annual expenses for the relevant direct cost items.
>
> **Indirect Practice Costs:** Indirect practice costs have been defined as those overhead or fixed expenses that are not easily allocable to specific services, but are instead incurred in the operation of the practice as a whole. Office rent and utilities, management costs, and non-medical supplies and equipment are often considered part of indirect costs. The precise delineation of indirect cost items will depend on the final definition of direct costs

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[1] It may be argued that a slightly broader definition of direct costs is appropriate. For example, the non-clinical (administrative) staff time required to schedule the patient and perform billing and collection tasks may be considered as a direct cost.

which is established.[2] The survey instrument will be worded appropriately to obtain annual indirect practice expenses for the specified set of indirect cost components.

Practice Characteristics: Direct and indirect costs can vary substantially based on differences in practice characteristics. Therefore, this section of the survey will collect information that will help analysts to identify and interpret variations in the pattern of direct and indirect costs across practices. Some of the practice characteristics that will be examined are: the number of clinical and administrative staff; the percentage of staff time related to clinical activities; the physical size of the practice; the percentage of procedures performed in the office versus in other settings; and the frequency of patient cancellations.

Case-Mix Data: The case-mix section of the survey will ask for data on the frequency with which each CPT- or HCPCS-defined service was performed by each practice (in the same year for which cost data were reported). Respondents will be urged to provide this information in electronic format to minimize the amount of data input required for the study.

The survey will undergo extensive review by HCFA and the TEG before it is released for distribution. The TEG will examine the instrument to ensure that it effectively captures all of the necessary data elements to satisfy the requirements of alternative methods for assessing practice costs. In addition, a pilot test will be conducted with a small sample of practices, varying in size, specialty, and type (solo or group), to identify any problems in item-specific clarity, feasibility of collecting case-mix data, questionnaire formatting, and length of administration.

2.1.2 Sampling Plan

The sample design for the practice-specific survey of practice costs is a critical element to ensuring that sufficient data are available to generate reliable and unbiased indirect cost estimates for the CPT and HCPCS services contained in the fee schedule.[3] The sample must be carefully

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[2] For instance, some researchers may contend that rent and utility costs could be allocated to specific services based on the time required to provide the services. Under this scenario, these costs would be identified with specific procedures and would, therefore, be labelled as a direct cost.

[3] The universe of CPT codes will be studied; in addition, those HCPCS services contained in the MFS will be included.

selected to obtain data from a representative sample of practices so that service-specific cost estimates reflect the characteristics of different practice types.

Abt proposes that the target population for the survey consist of medical (allopathic) practices in the United States, as well as key non-physician specialty practices. The American Medical Association (AMA) maintains two comprehensive databases that will be used to identify both solo and group medical practices throughout the country: the Physician Masterfile and the Census of Medical Groups.[4] Relevant non-physician specialty societies are being contacted to determine the optimal sampling frames for their specialties.

Abt Associates is currently working with the AMA in defining an appropriate sampling frame from these two databases. In developing the sampling strategy, Abt staff have carefully considered the strata which should be used to select a sample that represents broad segments of the target population. We have determined that practices should be classified using the following variables of classification: practice size, specialty, urbanicity, and region of the country. To eliminate bias in the survey estimates, proper weights will be applied to the data collected from practices in different strata to account for unequal probabilities of selection. We estimate that over 4,300 physician practices will need to be sampled in order to obtain 3,000 completed surveys. Sample size and frames for the non-physician specialties have not yet been determined.

2.1.3 Survey Administration

The survey will be implemented as a self-administered (mail) survey with advance telephone recruitment and extensive follow-up. Prior to distributing the surveys, Abt survey coordinators will determine the eligibility of the practices selected for sample. An advance letter and information packet, explaining the purpose and significance of the survey, will be sent to each practice. The survey coordinators will subsequently place telephone calls to the designated respondents, scheduled to coincide with receipt of the letter. In addition to drawing attention to

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[4] The Census of Medical Groups is a listing of group practices defined as three or more physicians. Therefore, solo and two-physician practices will be identified in the AMA's Physician Masterfile by deleting those physicians affiliated with a practice of three or more physicians.

the letter and information packet and encouraging cooperation in the survey during these calls, Abt survey staff will ask specific questions designed to ascertain whether the practice is eligible to participate in the survey. Practices operating for less than one year will be excluded from the sample because they tend to have unusual patterns of indirect expenses and will have difficulty completing survey items. Similarly, solo practitioners working less than 20 hours per week will be considered ineligible for the survey.

Once eligibility has been verified, questionnaire packets will be sent to the remaining practices. While the advance communication with sampled practices should serve to enhance receptivity to the survey, Abt will implement several other procedures to maximize the response rate. Extensive follow-up phone calls will be conducted by trained staff to convince sampled practices to complete and return the questionnaires. In addition, an 800-telephone number will be made available to respondents for clarification of technical and processing questions. To the extent that some practices are unwilling to compete the self-administered questionnaire in a timely manner, Abt survey coordinators will also attempt to schedule interviews with the appropriate practice staff to obtain the necessary data.

To track survey responses, an automated survey management system will be implemented to monitor the status of each survey and to identify potential non-response. Returned surveys will be subject to extensive quality-control procedures to check the validity and completeness of the data reported in the questionnaires.

2.2 CLINICAL PRACTICE EXPERT PANELS (CPEPs)

Service-specific resource profiles will be developed based on expert opinion and consensus achieved through Clinical Practice Expert Panels (CPEPs). In conjunction with the TEG and HCFA, Abt project staff will organize the CPEP Technical Expert Group (CPEP-TEG), an oversight and planning group for all CPEP activities. The CPEP-TEG will classify the over 8,500 CPT codes and other HCPCS services into relatively homogenous groups and will identify candidate reference services within each group. The service groupings will be assigned to and studied by approximately 12-15 individual CPEPS, consisting of physicians, practice

administrators, and other clinicians, that will develop resource requirements for the reference services from each group. These resource profiles will form the basis for estimating procedure-specific direct costs for the complete range of CPT-defined medical services. In this section, we explain the formulation of the CPEPs and CPEP-TEG and describe how the panels will function to 1) identify service groupings or "families"; 2) select reference services from each group; 3) establish resource profiles for each reference service; and 4) apply the reference service resource profiles to the remaining codes in each family to produce direct cost estimates for all CPT codes.

2.2.1 Role of the CPEP-TEG in Identifying Service Families and Reference Services

With over 8,500 services included in the MFS for which relative values must be estimated, the practice costs of only a subset of these services can be studied in detail. Therefore, a method of systematically identifying key procedures to examine and of extrapolating their cost profiles to the remaining services is planned. As mentioned above, the CPEP-TEG will be responsible for defining appropriate service families and identifying reference services from each group. All of the procedure families will be subsequently assigned to CPEPs, which will carefully assess the resources required to perform the reference procedure from each group.

The CPEP-TEG will represent both primary and specialty care and will be composed of physicians, other clinicians (e.g., nurses), and practice administrators. Each CPEP-TEG member will also be assigned to an appropriate CPEP, depending on his/her specialty and familiarity with the service groups, to participate in the direct cost resource profile exercises.

To guide the formation of the service groupings, Abt recommends that the families be organized based on the following three criteria:

- The codes in each family have comparable direct costs to simplify the extrapolation of direct costs for each reference service to other services in the family;
- The codes within a family are clinically related, to the extent feasible, to ensure that panelists on the CPEPs are familiar with all or most of the services in a family; and
- Assignment of CPT-4 codes and HCPCS services contained in the MFS to families does not rely on patient or physician-specific factors that would result in separate

payment rates for the same service that depend on factors not incorporated into the fee schedule (e.g., classifications based on patient diagnosis).

These criteria will be further refined and expanded, as appropriate, by HCFA and the TEG.

Prior to convening the CPEP-TEG, Abt will perform a comprehensive review of all CPT codes to develop preliminary service code groupings according to the final criteria agreed upon by the TEG and HCFA. This preliminary classification scheme will be presented to the CPEP-TEG. It will be based on two existing classification systems: the Ambulatory Patient Groups (APG) system developed by 3M and the Berenson-Eggers-Holahan (BEH) system.

Each of these systems has advantages and disadvantages for the purposes of the proposed practice expense project. For the most part, the different segments of the two systems complement each other. The APG system, with nine major categories and 297 APGs, is useful to the extent that it groups procedures performed on an outpatient basis according to resource and clinical homogeneity. However, it does not take into account the practice resources of inpatient services and classifies evaluation and management (E&M) codes by diagnosis. Conversely, the BEH system, which collapses CPT codes into over 100 categories, assigns inpatient and E&M services into groups of services with similar clinical characteristics and resource requirements that could be incorporated in a meaningful classification scheme for estimating practice expenses.

This approach to classifying services will be reviewed by the TEG and further refined by the CPEP-TEG. The CPEP-TEG will evaluate the comparability of direct costs and clinical homogeneity within the families. CPEP-TEG members will reassign codes to different groups if a service has been inappropriately classified. The results of this process will be a set of service families that are clinically coherent, resource comparable, and not dependent on patient or physician characteristics. Once the service groups are finalized, the CPEP-TEG will select from each family candidate reference services that will undergo detailed analysis. The service code groupings and reference services will be assigned to individual CPEPs, which will subsequently identify the resources necessary to provide each reference service. Each CPEP will also develop a ranking system which rates the costs (or resources required) for services within each group relative to the reference service. This ranking scheme will be used to extrapolate the cost of the

reference procedure to all other services within a particular family. The formation and specific functions of the CPEPs are described in the following sections.

2.2.2 Composition of Individual CPEPs

The number and composition of the CPEPs will depend on the final service families defined by the CPEP-TEG. Once the families are established, CPEPs will be organized according to the following considerations: 1) maximizing the extent to which CPEP members review services with which they are familiar; 2) maximizing the extent to which important providers of a service are represented on the panel evaluating that service; 3) ensuring sufficient cross-specialty representation on the panels; and 4) ensuring that panels have a reasonable number of services to study (neither too many nor too few).

We estimate that approximately 250 families will be identified that will be organized into approximately 12-15 CPEPs. Each CPEP will be assigned 15-20 service groups, resulting in an average of nearly 20 reference codes being assigned to each panel for development of resource profiles.

To identify the specialty composition of the CPEPs, the Part B Medicare Annual Data Procedure File (BMAD I) will be examined to determine the total number of services performed by each specialty in each service family. The specialties within each service family will be ranked by volume, until 90% of the volume is accounted for in that service group. This will determine the "representative specialties "for each service family. Using a combination of descriptive analysis and judgement, service families will be clustered such that the overlap of representative specialties across these groups is optimized. The number of representatives to include from each specialty will depend on the total number of specialties represented and on the relative volumes of services performed by each specialty. Once this process is complete, Abt will work with the Medical Group Management Association, the American Group Practice Association, and medical specialty societies to solicit and select physicians, other clinicians, and practice administrators to participate in the panels.

2.2.3 Role of Individual CPEPs in Developing Direct Cost Estimates for Specific Services

To develop direct cost estimates for each service, two separate CPEP panel meetings will be convened. The first meeting will be held to finalize the candidate reference services initially selected by the CPEP-TEG. In addition, each CPEP will also determine the resources required to provide these services within a physician office setting compared to other settings. Prior to the panel meeting, a "ballot", which contains the candidate reference services for each family as identified by the CPEP-TEG, along with the Medicare volumes and other useful data for each service, will be mailed to all CPEP members . They will be asked to select the one code from each group that is most representative of the services in that family. The ballots will be tabulated to determine which reference service within each group was deemed to be representative.

Once the reference services have been finalized, the CPEPs will determine the resource inputs needed to perform these services. Abt, in conjunction with the TEG and HCFA, will design a standard worksheet to ensure that the information on resource usage for individual services is collected in a consistent and thorough fashion. The worksheet will solicit data on the number of minutes spent on different activities by non-physician clinical and non-clinical (i.e., administrative) staff in providing the service and how that time varies depending on where the service is performed (i.e., physician office, free-standing outpatient department, or hospital setting); medical supplies associated with the service; and the equipment used[5]. The panel members will be required to complete the data collection worksheet for each reference service prior to the first meeting. Abt staff will subsequently compile the results from the worksheets and will prepare summary tables presenting the distribution of the data for use during the meetings. The panel will be asked to review these results and determine, through a consensus process moderated by Abt staff, which estimates accurately reflect the resources required in providing the reference services.

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[5] To estimate the costs of using equipment for specific services, data will be collected on the number of minutes the equipment is used for a given service, the frequency with which it is used each year in a practice for different services, maintenance requirements (including "downtime"), and its useful life.

The second panel meeting, held approximately two months later, will focus on reviewing direct cost estimates for each reference code and extrapolating these cost estimates to the remaining services within each group. Prior to convening this meeting, Abt staff will research the input prices (i.e., nurse wages and supply prices) specified in the resource profiles for each reference service. These prices will be applied to the data on resource usage provided by the CPEPs to derive direct practice costs for the reference codes. The panels will be asked to review these direct cost estimates to ensure that they accurately reflect the costs of the resources required in providing these services. Once the CPEPs have verified the reliability of the direct cost estimates for the reference services, these cost estimates will be extrapolated to the other services within each family. The extrapolation process will require panel members to rate the services within each group relative to the reference service for the family. This will result in each service being assigned a unique rating that represents the ratio of the direct cost for the service in question to the direct cost for the reference service. These ratings, or "adjustment factors", can then be multiplied by the direct cost of the reference service to produce direct cost estimates for all of the other codes in the family. The proposed classification system should facilitate this extrapolation exercise to the extent that services will be grouped according to resource and clinical homogeneity, thereby making it easier for panel members to gauge differences across procedures.

2.3 COLLECTION OF INPUT PRICE DATA

As mentioned above, following the initial CPEP meeting, Abt staff will collect data on input prices, including staff wages and supply and equipment costs, which will be combined with the resource profiles to develop procedure-specific direct cost estimates. Several secondary sources will also be used in compiling these data. For nursing wages, at least two databases will be examined: the National Sample Survey of American Nurses, which contains data on the average annual earnings of full-time registered nurses in various settings and positions for the year 1992; and the National Survey of Hospital and Medical School Salaries, which includes salaries of nurses by type and size of facility, census region, and type of nurse. Wages for other health care professionals (e.g., physician assistants and technicians) will be obtained from the

Employment Cost Index Survey which contains annual data on employer costs per hour worked for several health services occupations. These wages will be supplemented by and compared with the physician practice survey data, particularly for staff for which no publicly available data exist.

Supply and equipment costs are available through sources such as the Medical Device Register and the Health Devices Sourcebook. However, the costs from these sources represent the full, undiscounted list prices, which are rarely paid by most practices. Many physician groups secure discounted prices by purchasing their supplies and equipment through large purchasing organizations. Therefore, in conjunction with our subcontractor, CRAHCA, we plan to identify and contact such organizations to collect reliable data on supply and equipment costs. Abt staff will also contact a few of the major equipment and supply manufacturers to solicit information on the range of pricing arrangements that they offer their small and large customers. Equipment-related prices will be used in conjunction with utilization rates and useful life information to calculate per-service equipment costs.

3.0 RESEARCH DATABASE

A central objective of this practice expense study is to create data sets that can be utilized by HCFA and subsequent contractors to evaluate alternative techniques for generating practice cost estimates. These data sets will contain the data on aggregate practice costs compiled from the survey of medical practices; the estimates of resource usage developed by the CPEPs; and the input prices obtained through Abt's research of national secondary sources, large group purchasing organizations, and major equipment and supply manufacturers. The TEG will be the primary vehicle for ensuring that the database contains the relevant data elements in a *useable format* which enables other researchers to incorporate the data in alternative methods for evaluating practice expenses. Through its review and input on both the practice-specific survey instrument, the CPEP protocol and the analytic plan, TEG participants will help shape the final design of the database.

Abt will prepare documentation, including a data dictionary and user's guide, that will thoroughly describe the database, to facilitate its use and application by other researchers. The data dictionary will include variable definitions, frequencies and ranges, as well as limitations for

the use of each data element. The documentation will also include a description of the database structure, source files, and other relevant information (e.g., key merging variables).

4.0 DATA ANALYSIS

Abt project staff, working closely with HCFA and the TEG, will design and conduct a series of analyses based on the data collected in the survey and CPEPs to arrive at procedure-specific practice cost estimates for the CPT codes and HCPCS services on the fee schedule. The proposed analytic approach consists of four separate components: 1) extrapolation of direct costs; 2) allocation of indirect costs; 3) validation of procedure-specific costs; and finally 4) analysis of the impact of proposed practice-expense values. The purpose and function of each of these steps is explained below.

4.1 EXTRAPOLATION OF DIRECT COSTS

The profiles of the quantities of direct inputs for each of the reference services prepared by the CPEPs will subsequently be converted into dollar cost estimates. Accomplishing this requires that prices be assigned to each input identified by the CPEPs. These prices must then be multiplied by the quantity of the input to arrive at the cost of that input for each service. These input costs will then be summed for all the inputs for each service in order to estimate the service-specific direct cost.

When assigning prices to the list of inputs, two sources of variation will be considered:

- **Variation in the price paid for identical inputs.** Typical price levels will be estimated from multiple sources as discussed previously. Sound judgement and analytic tools will be used to arrive at the appropriate prices to assign to inputs.

- **Variation in type of input from one practice to another** (e.g., different brands with different capabilities). This factor will be particularly important in assessing capital costs. As noted earlier, the CPEPs will be useful in identifying the range of inputs used, in assessing the quality differences in inputs, and in coming to consensus on the appropriate configuration of inputs.

Once the direct costs for the reference services have been calculated, the extrapolation of direct costs from the reference service to the other services in a family will be performed. The direct cost estimate for all of the other services in a group will be equivalent to the direct cost for the reference service, multiplied by an adjustment factor as rated by the CPEPs. For example, a service-specific adjustment factor of 2.0, combined with a reference service direct cost of $50, results in a direct cost of $100. Similarly, if no adjustment factor is assigned, the direct cost of the service would be the same as that for the reference service. The resulting direct cost estimates and the data elements used in calculating these estimates will be added to the research database to provide other health care services researchers with the opportunity to assess the extrapolation method of generating direct cost estimates and to compare these results with those derived from alternative approaches.

4.2 ALLOCATION OF INDIRECT COSTS TO SPECIFIC SERVICES

Allocation of indirect costs to specific services is one of the more challenging methodological issues. Indirect cost allocation will be a critical determinant of the economic incentives produced by the practice expense relative values and, therefore, requires careful consideration. Working in conjunction with HCFA staff and the TEG, the Abt project team will assess a number of indirect cost allocation methodologies that have been recommended by several researchers including:

- **Work and/or Direct Costs.** Some methods allocate indirect costs based on the physician work and/or direct costs associated with a service. The advantage of using work is that measures of work currently exist for almost all CPT codes. However, the use of direct costs may be more appropriate to the extent that indirect costs depend on the level of direct costs (e.g., numbers and salaries of clinical staff) of the office practice.

- **Step-down.** The step-down methodology allocates different categories of indirect costs according to different rules (e.g., space is allocated based on time, while billing is assigned uniformly across all services). Such strategies are consistent with an accounting-based approach that relies on extensive micro-costing for direct costs.

- **Practice Characteristics-based Lump Sum Payment.** This approach recognizes indirect costs as being truly fixed and calculates a pre-set aggregate payment based on practices' characteristics. Multivariate regression is typically used to determine the importance of each practice characteristic in establishing the basis of the payment formula.

- **Cost Function.** A statistical regression approach can also be used to allocate indirect costs to particular services. Cost functions can be estimated to explain variation in practice level costs based on diversity in the mix of services produced and the costs of the inputs required to provide those services. In addition, cost function models can be used to assign indirect costs to broad classes of services.

While our proposal recommends using cost function analysis as a key tool in allocating indirect costs, the large number of services (or outputs) for which prices must be estimated complicates the implementation of a cost function. To facilitate the application of this approach, Abt suggests grouping the service codes into output categories. A regression analysis can then be performed to measure the effect of various service groupings on indirect costs. Alternatively, indirect costs can be allocated to each practice's case-mix based on the direct costs associated with the services. A statistic of central tendency, such as the mean or median, of the indirect costs can be calculated for each service across all of the practices to estimate the indirect cost for each service. Sensitivity tests of various allocation methodologies and measures of central tendency will be performed to assess their impact on an equitable payment structure. To the extent that these allocation methods require varying levels of disaggregation of indirect expenses, the survey instrument will be designed to capture all of the data elements necessary to evaluate the impact of each allocation approach. These data, as well as the indirect cost estimates resulting from the application of the different allocation strategies, will be incorporated into the database described above to enable researchers to examine the differences in indirect cost estimates that result from changing the methodology.

4.3 VALIDATION OF PROCEDURE-SPECIFIC COST ESTIMATES

The extrapolation process, which will be based on the reference service resource profiles and adjustment factors developed by the CPEPs, as well as the assignment of input prices, will

result in relatively straightforward estimates of service-specific direct costs for the over 8,500 CPT codes and HCPCS services on the MFS. However, as explained above, a variety of indirect cost estimates are most likely to emerge for each service based on the different indirect cost allocation strategies. In order to determine which allocation methodology and payment approach produces service-specific practice cost estimates that accurately reflect the resources required in providing these services, it will be necessary to subject the cost estimates to a final round of review.

The CPEP members, who will be familiar with the methodology and data used to develop the initial values, will be instrumental in this review phase. Following the extrapolation of direct costs and assignment of alternative overhead costs to each service, a list of the estimated per-service direct costs and alternative indirect and total service-specific practice costs (representing the sum of the direct and indirect costs) for a subset of the universe of codes will be sent to each CPEP member. Redundant assignment of services will be built into the review process, with each code being reviewed by at least two CPEP members. CPEP members will be asked to consider the different indirect cost estimates resulting from the application of each allocation strategy and assess which approach produces the most accurate per-service indirect cost estimates. In addition, they will perform a final check on the direct cost estimates, focusing particularly on the cost relations across services. The result of this process will be a single set of total service-specific practice costs that accurately reflects the differences in the resources required to provide the CPT codes and other HCPCS services.

4.4 AGGREGATE IMPACT ANALYSIS

Abt Associates will conduct an aggregate impact analysis that compares practice-wide expenses to simulated payments under the current Medicare Fee Schedule and under the resource-based payment approach resulting from this study. Since payer-specific case-mix will not be available, these analyses will be based on the assumption that the proposed payment method applies to the entire practice.

The case-mix data collected in the physician practice survey will be used to determine aggregate reimbursements under the new payment approach. Total volumes of each physician

service provided by a practice will be multiplied by the estimated practice expense payment for that service, with the resulting reimbursements for services summed to estimate aggregate practice expense reimbursement. This calculation will be compared with actual aggregate practice expenses reported in the survey and with reimbursement, as calculated from the current MFS formula, to determine the effect of estimated payments on the practice from both a cost and current reimbursement perspective. In all cases, both costs and revenues of each practice will be deflated by the appropriate practice expense geographic practice cost index (GPCI) to account for geographically-determined cost differences. To help HCFA assess the overall equity and efficiency of the proposed payment approach, these analyses will consider the differences in estimates by specialty, geographic region, urban-rural location, practice size, and other factors considered important to analyze by the TEG. Particular attention will be paid to practices in areas with inadequate access to physician services.

5.0 ANTICIPATED TIMETABLE - FIRST YEAR

During the first year of this study, Abt will work in conjunction with HCFA to convene the initial meeting of the Technical Expert Group (TEG); field the survey of practice costs; conduct the CPEPs which will develop resource profiles for the reference services selected from each family and extrapolate these profiles to the remaining codes in each group; and construct the database containing the results of the survey of practice costs. The projected timeframe for completion of these activities is provided below.

Activity	Anticipated Timeframe
TEG Meeting	May 31, 1995
Practice-Specific Survey	Fall 1995
CPEP Meetings (first round)	Fall 1995 (development of resource profiles for reference services)
CPEP Meetings (second round)	Spring 1996 (extrapolation)
Practice-Specific Survey Database	May 1996

6.0 CONCLUSION

This project represents a challenging opportunity to examine and explore various options for developing resource-based practice expense values that more accurately reflect the costs of providing Medicare-covered services in different settings. Abt will conduct a survey of medical practices and will convene a series of Clinical Practice Expert Panels to collect and analyze practice expense data on both a practice and service-specific level. Accounting and econometric techniques will be used in generating per-service direct and indirect cost estimates for CPT codes and alpha-numeric HCPCS services contained in the MFS. A comprehensive database, which combines all of the data collected as part of the survey and the CPEPs, as well as the results of Abt's analysis, will be developed to enable other researchers to assess alternative methods of calculating per-service practice-expense estimates.

Abt and HCFA staff recognize that generation of resource-based practice expense values requires implementation of a technically proficient strategy that takes into account many complex data collection and analytic issues. Therefore, as explained previously, Abt will involve the physician community and other prominent health care services researchers in the project to ensure that reliable practice expense cost data are compiled and effectively incorporated into the research database.

Data Collection and Analysis for Generating Procedure-Specific Practice Expense Estimates

HCFA Contract No. 500-95-0009

Briefing Paper #2

Practice-Specific Data Collection: Sampling Plan

May 24, 1995

Abt

Abt Associates Inc.

Prepared by Abt Associates Inc.

1.0 INTRODUCTION

The Health Care Financing Administration (HCFA) is funding the project "Data Collection and Analysis for Generating Procedure-Specific Practice Expense Estimates" to provide an empirical foundation for a resource-based approach to measuring physician practice costs under the Medicare Fee Schedule (MFS). A key part of this project is the survey of physician and selected non-physician practices. The primary use of the practice survey data in the project is to measure the indirect cost totals at the practice level, and the service mix of the practices. From the indirect cost and service mix data of each practice, allocations will be made to the individual services the practices produce. These allocations may be made at the practice level and then averaged in some way, such as the computation of a median for practice-specific, service-specific allocations. The allocations may also be made with the use of a regression analysis (instead of or in addition to averaging).

The primary objective of the survey, then, is to collect a sample of practice-level total indirect cost (which will entail collecting total cost as well), and also practice level profiles of services offered, such that the sample is reasonably representative along different dimensions that affect the indirect cost per service. In that the true determinants of indirect cost per service are not known *a priori*, and the actual method of allocation has not been determined, the operative philosophy for sampling practices is flexibility. This implies that the efficiency of sampling is not optimized for any one method and set of assumptions about cost structures, but is designed to provide acceptably precise estimates under a range of assumptions and methods[1].

2.0 SAMPLING UNIT AND SAMPLING FRAME

Given that the primary cost information is needed at the practice level, the sampling unit is the practice, whether it be a solo, two person or group practice consisting of three or more physicians or non-physician professionals. Therefore, a sample of practices will be selected from the population or universe of practices. The basic sampling weight for the purpose of estimating

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[1] See Attachment A for a more technical discussion of the estimation objectives of the survey.

population totals or averages will be the ratio of the number of practices in the population in a stratum to the number of practices selected in the sample from that stratum.

The sampling frame for the survey of physician practices is being constructed using a combination of two files from the American Medical Association (AMA). The AMA's Census of Medical Groups (CMG) contains data on medical groups of three physicians or more. The AMA Physician Masterfile provides a comprehensive list of each physician in the country. The sampling frame is a combination of the CMG practices and those physicians on the Masterfile indicating that they are in one or two physician practices.[2] It is not possible to consistently match physicians in two physician practices to their partners; we will accommodate this redundancy by adjusting the sampling weights accordingly. The sampling frame also contains information obtained from the AMA on basic characteristics such as practice size, specialty or specialties, census region, and whether a practice is in a rural or urban area ("urbanicity"). Specialty codes on the Masterfile and the CMG file will be based on a common coding system. All these variables are discussed in more detail below in the stratification section.

Although both of the AMA listings are believed to be complete, current, and of high quality, some inconsistencies may exist. One type of inconsistency occurs when a physician is categorized as solo or two-physician practice on the sampling frame but is actually in group practice. This and other types of misclassification will be known only after sampling. These problems can be handled at the time of estimation by using proper weights. We will still obtain unbiased estimates of costs, but the efficiency of the estimates will be slightly lower if we had no misclassification. There will also be a check of the sampling frame for any serious under-coverage of practices with specific characteristics. Practices on the frame that are considered out of scope for the survey, should not cause any serious problems, as these could simply be removed after they are identified in the sample without changing the weights of other in-scope units. This would not cause any bias in the estimates.

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[2] Of the approximately 600,000 U.S. physicians, about 330,000 are represented in this frame. About 160,000 other physicians are employed by hospitals, government, or other entities, and about 110,000 are not in active patient care.

Other non-physician professional groups such as optometrists, podiatrists, psychologists, and physical therapists may also be included in the survey. Separate sampling frames for each of these groups are being developed from the membership lists of their respective professional societies. Sample design for the sampling of non-physicians will resemble the design for sampling physicians. The non-physician groups will be treated as separate strata and samples drawn from each. One difference will be that practice size must be dropped from the stratification for non-physicians, since the membership lists only contain information on individual practitioners, not practices.

One concern about the sampling frames constructed on the basis of the lists given by the Associations is the extent of under-coverage since the lists only include Association members. Sampling from an incomplete frame is not a problem so long as there is no systematic exclusion of specific groups which could cause a bias in the estimates. It is not necessary to know the exact total population size in each of these groups as we are not estimating totals but averages. Again, if there are units on the frame which are out of scope, these could simply be removed after they are identified in the sample without changing the weights of other in-scope units. This would not cause any bias in the estimates.

3.0 STRATIFICATION

3.1 PURPOSE

The primary purpose of stratifying the sample in this survey is to make the sample representative of the population of practices and also to obtain significant gains in the reliability of the estimates over those that would be obtained without stratification. Stratification is not intended for purposes of obtaining separate estimates for each stratum with some respecified reliability. The basic principle of stratification is to make the within-stratum variability of the characteristic of interest as small as possible while at the same time maximizing across-strata variability.

3.2 STRATIFICATION VARIABLES

Two variables that are thought to have the largest impact on service specific indirect cost are practice size and service mix. Therefore, it is important to stratify practices by size and service mix. But since overall service mix (Medicare plus other payers) at the practice level (as opposed to the physician level) is not known in advance of sampling, the specialty composition of the practice will be used as a proxy. In addition to these variables, it is also important that the sample has regional representation to ensure that regional differences, if any, are reflected in the sample. Also, urbanicity may have an important effect on practice expense structures. For purposes of sample selection, a stratum is defined by categories of these four variables. Although the cross classification of the different categories of these variables produces a large number of strata, not all the strata are expected to contain practices and some may have to be collapsed. In ensuring representation for these key sub populations in the sample, we are also avoiding any possible conditional bias in the estimates. What this means is that a random sample without stratification may contain a disproportionate number of units from each of the subpopulations as compared to the original population. Such a sample will produce a biased estimate in the sense that the average of all possible estimates with the same disproportionality will not equal the population average. On the other hand, we also have to recognize that creating too many strata may lead to smaller sample sizes within strata or a larger sample size than the one targeted. This happens when a targeted sample is allocated to strata. The resulting sample size in some strata may be zero. In this case, we will have to take a minimum sample size, causing the actual realized sample size to be bigger than the targeted sample size.

The next step after defining the stratification variables is to determine the number and definition of categories for each of them. The categorization for the four stratification variables (region, urbanicity, practice size, specialty) are discussed next.

3.3 REGION AND URBANICITY

For categorizing regions, the nine census regions used by the U.S. Bureau of Census will be adopted. Urbanicity is defined by categories namely, rural and urban. All practices located in

Metropolitan Statistical Areas (MSAs), as defined by the Office of Management and Budget (OMB), are considered urban, and all others rural.

3.4 SPECIALTY

As discussed above, specialty composition of the practices proxies for their service mix. There are two important issues that must be addressed in categorizing practices by specialty. First, a specialty categorization system must be selected. The AMA uses several different categorization systems for different purposes. There are over 100 self-designated specialties on the AMA Physician Masterfile. In addition, the AMA collapses these specialties into systems of 40, 25, 9, and 4 categories. The Medicare program also has its own specialty classification system with over 80 categories. For purposes of stratification, the primary categorization that will be used is the 25-category system used on the AMA's CMG. A more detailed system cannot be used for group practices since the CMG data do not provide more detailed information on specialty. In addition, the number of specialty categories must be modest to prevent the number of strata from growing too large. As a result, and to provide consistency, the 25 categories will also be used for the one and two-physician practices from the Masterfile. These 25 categories are shown in Exhibit 1, along with four more aggregate categories also used by the AMA. This system should provide a sufficient level of detail to capture the effect that specialty has on basic service mix and cost structure.

A second issue to be addressed is how to categorize multi-specialty groups by specialty. The diversity of practice arrangements for these groups requires some care in sampling to ensure representativeness. It is likely that the scope of practice is an important determinant of indirect cost, in aggregate and at the service level. The scope of practice, in turn, should be highly correlated with specialty composition. The basic approach that will be taken is to add multi-specialty group as an additional specialty category, and to sub-stratify the multi-specialty groups according to their scope of practice. The issue of how to categorize multi-specialty groups according to their scope of practice is complex, and could lead to an extremely large number of strata. To address this problem, a simple approach is being taken which will still allow us to

stratify according to different scope of practice arrangements, as proxied by the specialty composition of the practices.

For each multi-specialty practice[3], the AMA CMG data contain the number of physicians in each of the 25 specialty categories. We have collapsed these 25 categories into the four-category system used by AMA (shown on Exhibit 1), which summarizes specialties into general practice, medical specialty, surgical specialty, and other specialty. A multi-specialty practice can have any one of 16 possible combinations of these four basic types of physicians.

EXHIBIT 1
Aggregation of Group Specialties

AMA Aggregate Specialty Category	AMA Group Specialty Category
General/Family Practice	General/Family Practice
Surgical Specialties	General Surgery
	Neurological Surgery
	Obstetrics and Gynecology
	Ophthalmology
	Orthopedic Surgery
	Otolaryngology
	Plastic Surgery
	Thoracic Surgery
	Urological Surgery
Medical Specialties	Allergy and Immunology
	Cardiovascular Disease
	Gastroenterology
	Internal Medicine

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[3] It should be noted that of 12,000 single specialty group practices, 20% do not have a specialty code; similarly, 1/3 of the 3300 multi-specialty practices are missing specialty information. These will be treated as belonging to a separate stratum and accordingly.

EXHIBIT 1
Aggregation of Group Specialties

AMA Aggregate Specialty Category	AMA Group Specialty Category
	Pediatrics
	Pulmonary Diseases
Other Specialty	Anesthesiology
	Dermatology
	Radiology
	Diagnostic Radiology
	Radiation Oncology
	Emergency Medicine
	Neurology
	Psychiatry
	Other

This approach defines 16 sub-groups into which multi-specialty groups can be categorized for purposes of stratification. Even this simple approach to stratification for scope of service significantly increases the total number of initial strata (before collapsing). It should, however, allow for a much more representative sample of multi-specialty group practice arrangements.

3.5 PRACTICE SIZE

The distribution of group practices by size category (as defined by the AMA) is given below. The Table on the next page is based on the data contained in the Masterfile and also the CMG file. According to the AMA data, the number of physicians in group practices ranges from three to more than 3000. Most groups tend to be small. Forty five percent of all groups have three or four physicians, but represent only 13.7 percent of physicians in group practices. Groups with 100 or more physicians represent only about 1% of practices but 1/3 of physicians in group practice and 16% of the total number of physicians. Solo practices account for 60% of the

practices and 25 % of the physicians. It is not possible to identify two-physician practices in advance of sampling, since the AMA data only identify individual physicians in two physician practices, and not the actual practices.

The size categories to be used for stratification are dependent on the basis chosen to allocate the sample. Allocation of the overall sample to different strata depends on the number of practices within each stratum, the variability of the characteristics of interest among practices within each stratum, and also the number of physicians. The key characteristic of interest is the service-level indirect cost. The variability of this measure has no clearcut a priori relationship to practice size. Plausible reasons can be hypothesized for either small or large practices having more variability in service-level indirect cost. If small practices had more variability, then sampling based on the number of practices would improve the precision of the overall estimates. Similarly, sampling based on number of physicians would improve precision if large practices had more variability. Based on a balancing of these tradeoffs in the face of uncertainty, we recommend allocation of the overall sample to each stratum in proportion to a measure of size obtained by multiplying the 3/4 th root of the average number of physicians by the number of practices in each size group. (Sample allocation is explained in greater detail in the next

EXHIBIT 2
Distribution of Practices by Group Size

Group Size	Number of Practices	% of Practices	Number of Physicians	% of Physicians
1	93900	59.9	93900	25.2
2	46950	29.9	93900	25.2
3	3666	2.3	10998	2.9
4	3545	2.2	14180	3.8
5-6	3781	2.4	20375	5.5
7-9	2022	1.3	15640	4.2

EXHIBIT 2
Distribution of Practices by Group Size

Group Size	Number of Practices	% of Practices	Number of Physicians	% of Physicians
10-15	1383	0.9	16468	4.4
16-25	744	0.5	14767	4.0
26-49	466	0.3	16021	4.3
50-75	146	0.1	8742	2.4
76-99	67	0.04	5752	1.5
>=100	189	0.12	61415	16.5
Total	156859	99.9	372158	99.9

section). Given this method of sample allocation, a method of defining size strata, then, would be as follows. First, we consider solo and 2 physician practices as separate strata. Then we create equal intervals on the cumulative measure of size scale for group practices assuming that we need 5 strata. This leads to the following stratification boundaries:

1
2
3-4
5-9
10-25
26-99
=>100

The stratification variables discussed above create a large number of theoretical sampling strata. It is possible to collapse these strata once we have the actual distribution of population of physician practices in these strata. This is expected to reduce the number of strata substantially.

3.6 STRATIFICATION OF NON-PHYSICIANS

Each of the non-physician groups will be considered a specialty. Other stratification variables are census region and urbanicity. Since the membership lists from the non-physician societies only contain individual membership records, practice size cannot be used for stratification. This is not a large problem in that many of these professionals are believed to be in solo practice. The key characteristic of interest is the service-level indirect cost. The sample allocation and selection will be similar to the one suggested for sampling physician practices (except for the size allocation). Non-solo practices will be identified after sampling, and the practice expense measurement will be done at the practice level.

4.0 SAMPLE SIZE

We plan to obtain a surveyed sample of approximately 3000 physician practices and approximately 500 non-physician practices. For any of the relatively common services, this sample should result in a domain sample of well over 200 practices that perform each of those services. It is expected that at least the most common 300 services will have their cost averages based on samples sizes of 200 or more. Of course for less-common codes, the estimates may not be based on an adequate sample of practices unless the sample size is substantially increased. Even then, there is no guarantee that estimates for rare services will be reliable. It is estimated that for 3000 completed interviews, we need to identify 5000 practices, of which we expect to sample 4200 eligible physician practices. This number is based on the assumption that there will be a 30% loss in the sample size due to nonresponse and other reasons.

5.0 SAMPLE ALLOCATION

The allocation of the overall sample of 4200 practices to the strata will be done in two phases. First, the overall sample will be allocated to size strata. As discussed above, there are several allocations that we could consider. We recommend a compromise allocation which is more robust to deviations from the assumptions made regarding the variability of indirect costs. This allocation, in addition to giving reasonably large sample sizes from solo and two physician

practices, gives moderate sample sizes from the larger size groups. The allocation is done as follows. First, a measure of size is constructed for each size group which is the product of the number of practices and the 3/4 root of the average number of physicians in that size group. Then the total sample is allocated in proportion to this measure of size.

Using the most recent AMA data the allocation is as follows.[4]

Size Group	Number of Practices in the population	Measure in size	# in Sample
1	93900	93900	1577
2	46950	78960	1326
3-4	7211	18418	310
5-9	5803	22818	384
10-25	2127	15955	269
26-99	679	11785	198
=>100	189	8100	136
Total	156859	249936	4200

Second, the allocation of the sample in each size group to specialty, census region, and rural and urban location will be directly proportional to the number of practices in each of those sub groups. While variability may differ across specialities or regions, it is difficult to base the allocation on unknown variability within strata. Also, we are interested in estimating cost for many services and even if the allocation is optimum with respect to estimating the cost for one service, it may not be optimum with respect to some other services.

This allocation scheme may result in a sample size of zero for some stratum. This could be solved in two ways. Either we specify a minimum sample from each stratum, or we collapse

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[4] Havlicek, Penny, et. Al., Medical Groups in the U.S.: A Survey of practice Characteristics, 1993, American Medical Association.

problem strata. Of course, this has to be done carefully so as to facilitate aggregations of stratum level estimates.

Once the number of practices to be selected in a stratum is determined, then a simple random sample of practices will be selected from that stratum. Every practice in a stratum has an equal chance of being included in the sample.

6.0 PLANS FOR ESTIMATION

Attachment A contains a discussion of the specific estimation that is planned. For these estimates of average indirect cost per service, stratum estimates will be the basic building block. Two average per-service indirect cost estimates will be obtained, unweighted and volume-weighted. For each service, the unweighted estimate will be the average across practices of the practice-specific average indirect cost allocation to that service. Similarly, the weighted average will be the sum across practices of the total indirect cost allocated to the specific service code, divided by the sum across practices of the volume of that service. In both cases, the estimates will be ratio estimates, since both the numerator and the denominator are random variables. Both are random variables, since the number of practices performing a specific procedure is not known in advance of sampling.

Though we do not expect all practices in a stratum to be performing a given service, the estimates of average cost are expected to be reliable because of the correlation between the total cost and the number of practices performing that service. Variances of these estimates will be estimated using the standard Taylor linearization method.

ATTACHMENT A
Background on the Estimation Objectives of the Survey

The primary use of the practice survey in the project is to measure indirect cost totals at the practice level and to allocate each practice's indirect cost to the individual outputs it produces. We can define the total cost for practice "j" as the sum of its indirect cost and direct cost:

$$TC_j = IC_j + DC_j$$

Notating an individual service (of "n" HCPCS codes) with the index "I", the practice's direct costs are the overall sum of all services of the service-specific direct cost multiplied by the quantity of that service produced:

$$DC_j = \Sigma_{i=1}^{n} DC_{ji}Q_{ji}$$

so that its total costs are equal to:

$$TC_j = IC_j + \Sigma_{i=1}^{n} (DC_{ji}*Q_{ji})$$

The allocation process will assign the indirect costs, IC_j, to each of the service codes produced by the practice by using an allocation method which exactly exhausts indirect costs over the output produced by the practice. Defining A_{ji} as the allocation factor for practice j and service I, we can write the expression for practice j's average indirect allocation for a specific service code:

$$IC_{ji} = (IC_j*A_{ji})/Q_{ji}$$

so that

$$IC_j = \Sigma_{i=1}^{n} IC_{ji}Q_{ji}$$

The A_{ji} depends on the allocation method used, but we can express it generally as being defined by the system of allocation weights and the mix of services produced by the practice:

$$A_{ji} = [W_i\ Q_{ji} / (\Sigma_{i=1}^{n} W_i*Q_{ji})]$$

so that the estimated indirect cost for a service at the practice level is:

$$\begin{aligned} IC_{ji} &= IC_j*[W_iQ_{ji} / (\Sigma_{i=1}^{n} W_i*Q_{ji})]/Q_{ji} \\ &= IC_j*[W_i / (\Sigma_{i=1}^{n} W_i*Q_{ji})] \end{aligned}$$

We seek to estimate the mean across practices of this measure for each service[5]:

$$\mu_{ICi} = \Sigma_{j=1}^{m} \{IC_j * [W_i \; / \; (\Sigma_{i=1}^{n} W_i * Q_{ji})]\}/m$$
$$= W_i * \{\Sigma_{j=1}^{m} [IC_j \; / \; (\Sigma_{i=1}^{n} W_i * Q_{ji})]\}/m$$

Thus we see that the estimates depend on the following factors:

- The level of indirect cost in the practices
- The vector of services produced by the practices
- The allocation weight used to assign indirect cost to specific services

It is all three of these factors together that determine the estimates. Thus, it is not strictly the level of indirect costs that is relevant, nor the fraction of total cost represented by indirect cost, but the level of indirect costs relative to the total output of the practice as weighted by the allocation weights. For convenience, we describe this ratio of indirect cost to the allocation weighted practice output as the Indirect Cost Allocation Ratio, or ICAR.

$$ICAR = IC_j \, / \, (\Sigma_{i=1}^{n} W_i * Q_{ji})$$

This value clearly depends on the set of allocation weights W_i, which are defined by the allocation method. Some candidates for allocation weights are:

- physician work
- physician work plus direct cost
- physician time

The distribution of these ratios across practices will vary depending on the allocation method used.

Given that a key issue for the practice expense project is the allocation method, and that this method will not be decided upon until well after the survey is fielded, we will pursue a stratification and sampling approach that is robust to the method of allocation. Such an approach will not be optimal for any one allocation method, but will be serviceable for all. Pursuing a stratification that was optimal for one allocation method could produce very high estimation variances for estimates using another allocation method. A more robust stratification will focus on the mix of services in a practice and the practice's size.

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[5] As discussed in our proposal, this estimate will be made only for services with significant volumes. Other estimation methods will be used for low volume services.

Similarly, while an optimal sample for estimation of one service code's indirect cost might be possible, no single sample is optimal for all the codes we are to estimate. A sample that is robust and efficient in this regard will focus more heavily on commonly performed services.

The key characteristic of the practices with respect to the estimation is the "mix of services," defined more formally as the service vector $\mathbf{Q} = Q_1, Q_2, \ldots, Q_n$ for the n HCPCS services included in the study. It is important that the strata define practices with similar patterns of services provided so that the variances of service-specific estimates are not inflated due to zero volumes for some practices.

Data Collection and Analysis for Generating Procedure-Specific Practice Expense Estimates

HCFA Contract No. 500-95-0009

Briefing Paper #3

Practice-Specific Data Collection: Instrument Design/Administration

May 24, 1995

Abt

Abt Associates Inc.

Prepared by Abt Associates Inc.

1.0 INTRODUCTION

The draft Survey of Practice Costs (see Attachment I) was designed based on material included in the RFP, questionnaires Abt Associates has used in previous studies of practice costs, and the experience of Abt staff in conducting surveys of medical practice. The project staff will work closely with the HCFA Project Officer, other designated HCFA staff, and the Technical Expert Group (TEG) to refine this draft to create a survey instrument that captures data necessary for the intended analyses. It is useful to understand how this survey fits into the data collection plan and, for this reason, we will present a brief overview.

The target population for the survey is office-based medical practices in the United States. In some instances, the practice will be represented by a sole physician proprietor or two physicians practicing in a partnership; in many other cases, the practice will consist of a group of physicians which may be owned by the physicians themselves or by a corporation. Our procedures are designed to identify the staff in the practice who have ready access to information on practice costs and case-mix. In small practices, this may be a physician; in larger groups, the survey tasks may require several individuals, for example, staff in the accounting and billing departments of the practice.

Our initial contact with the practice will be a letter mailed to the practice administrator. This will be followed by a telephone call that will determine eligibility, identify the appropriate point of contact for the survey, and identify potential nonrespondents so that we can begin to address their concerns early in the survey process. For practices that are agreeable in the initial call, the third step will be mailing the self-administered questionnaire to participating practices. As described in the Survey Administration section, the questionnaire will request information about practice costs and will request case-mix data on machine-readable diskettes. An 800 number will be available to respondents for technical or administrative questions that they may have. The questionnaire will contain a date by which we expect the return of a completed questionnaire, and practices that do not respond by this date will be contacted again. Questionnaires that have been mislaid will be replaced by mail. Although the questionnaire is designed to be self-administered, if necessary, we will conduct a telephone interview to obtain the desired information. Completed

questionnaires will be carefully edited for missing or inconsistent information. Practices will be recontacted to supply missing data or clarify any ambiguities.

1.1 DRAFT SURVEY

For ease of administration, the instrument has been organized into five sections and also includes instructions to the respondents. Exhibit provides a brief summary of all the data elements for the Survey of Practice Costs. In this table, a description of each data element is provided along with a description of the type of data it is (i.e., percentages, dollar amounts, numbers, etc.), and whether the information is likely to be an estimate rather than derived from actual data. Described below is the purpose of each section and its intended analytical use.

The instructions to the respondent are critical to ensuring that the respondent understands the purpose of the survey, that data are collected in the same manner from all practices, and that they are made aware of a toll-free number they may call if they have specific questions regarding the survey instrument or general questions regarding the study. In addition, the instructions include a definition of what a "practice" is so that the physicians and/or practice administrators understand the limits of what their practice costs and case-mix data should include. This is especially helpful for practices with multiple sites that may, in some cases, extend across various geographical locations. The instructions also clarify that the data captured in the survey should reflect case-mix data and practice costs incurred during the last complete fiscal year. Following this is a set of more specific instructions on how to respond to certain data elements contained in the survey, and what they should do with the survey once it is completed.

1.2 SECTION I -- CASE MIX DATA

In this section, we ask for each HCPCS code and the frequency that the service was performed by each practice. The case-mix data will be necessary in the estimation of specific allocations of indirect costs to procedures. In addition, it will be useful in performing simulations of the effect of the payment reform on various types of procedures. This information, together

with the data collected in other sections, will provide the HCFA with a complete delineation of all facets of the sampled physician practices.

Because we anticipate that the majority of the practices will be able easily to collect case-mix data from their computerized billing records, we will ask practices to provide these data on a computer diskette. However, if this is not possible, instructions will indicate that paper copy is acceptable.

Data on HCPCS code volumes by site-of-service will not be requested. While such information would be useful, we think that it will be burdensome for many respondents. Therefore, such a request is likely to increase non-response.

1.3 SECTION II -- DIRECT PATIENT CARE COSTS

The purpose of this section is to gather information that can be used to assist the Clinical Practice Expert Panel (CPEP) members in developing procedure-specific resource quality profiles for reference procedures. The direct clinical practice cost data collected in the survey instrument can be used to validate the CPEP estimates to ensure that an accurate estimate of direct clinical practice costs are established.

1.4 SECTION III -- INDIRECT PRACTICE COSTS

Indirect support costs can vary greatly across practices, specifically due to practice size and practice type. The collection of information in this section will allow us to measure aggregate indirect costs and examine sources of variation across practices. This section asks separately for several components of indirect costs in order to determine the key determinants of variation and magnitude of aggregate costs and to facilitate development of alternative allocation strategies. Indirect support cost estimates, along with practice information and case-mix data, will be used to produce procedure-specific coverage estimates of indirect costs.

1.5 SECTION IV -- PRACTICE INFORMATION

The following types of data will be collected in this section: staffing patterns, staff functions, and practice profiles of services provided. Specifically, direct and indirect costs can vary greatly due to the number of clinical and administrative staff, the physical size of the practice, where (office or other setting) various services are provided, allocation of staff time related to clinical activities, time physicians spend outside of the office engaged in activities related to clinical practice, and the extent to which patients "no show" and cancel appointments. Data collected on the number of full-time equivalent (FTE) staff and their average hourly wages will be useful for the CPEPs as they develop procedure-specific resource profiles.

The data collected in this section, when combined with case-mix data, will help analysts further understand and interpret differences or variations across physician practices, which can greatly affect both direct and indirect costs.

Exhibit 1. Summary of Data Elements for the Survey of Practice Costs

Section	**Data Element**	**Data Type**	**Estimate in lieu of Actual Data**
Practice Case-Mix	Frequency of all HCPCS-4 codes performed by entire practice. Supply this information on diskette, if available. This includes surgical, diagnostic, and evaluation and management services summarized across all physicians.	Mixed - Different formats for each practice	Not Applicable to any items in section
Direct Patient Care Costs	1. Date of Fiscal Year	Date	Not Applicable to any items in section
	2. Clinical Personnel Salaries	$ Value	
	3. Clinical Personnel Fringe Benefits	$ Value	
	4. Purchased Medical Equipment	$ Value	
	5. Leased Medical Equipment	$ Value	
	6. Medical Supply Costs	$ Value	
Indirect Practice Costs	1. Facility Costs	$ Value	Not Applicable to any items in section
	2. Non-medical Supplies and Equipment	$ Value	
	3. Professional Liability Insurance Premiums for Non-Physician Staff	$ Value	
	4. Other Professional Costs for Physician and Non-physician Staff	$ Value	
	5. Support Personnel Costs	$ Value	
	6. Other Administrative Costs	$ Value	
	7. Other Costs (not listed)	$ Value	
	8. Total Indirect Costs	$ Value	

Section	Data Element	Data Type	Estimate in lieu of Actual Data
Practice Information	*Percent of Procedures for Inpatient, Outpatient, Office and Other*		
	1- 4. Anesthesiological Procedures	Percentage	
	5- 8. Surgical Procedures	Percentage	
	9-12. Radiological Procedures	Percentage	
	13-16. Laboratory Procedures	Percentage	
	17-20. Evaluation & Management Procedures	Percentage	
	21-24. Other Diagnostic Tests Procedures	Percentage	
	Full-time Equivalent Physicians		
	25-63. 25 Physician Specialties and 10 Non-physician Specialties	Numbers	
	64. Continuing Medical Education	Percentage	Yes
	65. On Call or Stand-by	Percentage	Yes
	Clinical (Non-Physician) Personnel		
	66-67. Registered Nurses	Number/$ Value	
	68-69. Licensed Practical Nurses	Number/$ Value	
	70-71. Physician Assistants	Number/$ Value	
	72-73. Technicians	Number/$ Value	
	74-75. Other 1	Number/$ Value	
	76-77. Other 2	Number/$ Value	
	78-79. Other 3	Number/$ Value	
	80-81. Total Clinical Personnel	Number/$ Value	
	Administrative or Clerical Personnel		
	82-83. Medical Secretaries	Number/$ Value	
	84-85. Scheduling Secretaries	Number/$ Value	
	86-87. Receptionists	Number/$ Value	
	88-89. Insurance/Billing Personnel	Number/$ Value	
	90-91. Medical Records Personnel	Number/$ Value	
	92-93. Database Personnel	Number/$ Value	
	94-95. Housekeeping	Number/$ Value	
	96-97. Security	Number/$ Value	
	98-99. Administrative/Management	Number/$ Value	
	100-101. Other 1	Number/$ Value	
	102-103. Other 2	Number/$ Value	

Section	Data Element	Data Type	Estimate in lieu of Actual Data
Practice Information	*Percentage of Administrative Staff time devoted to…*		
	106. Office Patients	Percentage	Yes
	107. Patients not seen in office	Percentage	Yes
	108. Non-patient care support	Percentage	Yes
	Percentage of patients in a typical month that…		
	109. Cancel appointments	Percentage	Yes
	110. No shows	Percentage	Yes
	111. Must be re-scheduled because physician is not available	Percentage	Yes
	112. Type of practice (academic, HMO)	Categorical	
	113. Number of sites	Number	
	114. Number of examining rooms	Number	
	115. Number of procedure rooms	Number	
	116. Square footage	Number	
	117. Does your practice own or lease	Categorical	
Summary Information	1. Number of minutes it took to complete survey	Number	Not Applicable to any items in section
	2. Use of (computerized records, hard copy, both)	Categorical	
	3. Name of practice, name and phone number of contact person	Open-ended	

1.6 SECTION V -- SUMMARY INFORMATION

This section contains three data elements: the time it takes the respondent to complete the survey, whether data were derived from hard-copy or computerized records, and the respondent name and phone number.

The information obtained from the first two items mentioned above may be helpful to future studies that HCFA conducts. Analysts may be interested in the length of the survey and its variation across practice types. The type of records the respondent uses, hard-copy or computerized, may also help to shape the mode of data collection for future studies, such as electronic transfer of data.

Based on Abt Associates' extensive work in survey research, it has proven to be extremely useful to obtain the respondent's name and phone number. This common practice for self-administered questionnaires has been found effective if data retrieval is necessary after the questionnaire is returned to Abt. It also serves as an address to mail a letter thanking the respondent for participating in the study.

2.0 PILOT TEST

Pilot testing the survey is a key component to the instrument design phase of this project. It allows for discussion with respondents regarding item-specific clarity and meaning, questionnaire formatting, length of administration, and overall design of the survey instrument. We plan to obtain pilot test respondents through our TEG members, MGMA, and our consultants (e.g., William Katz). In our prior experience with pilot tests, we have found that working with practices local to Abt Associates will allow for in-person debriefing on the survey instrument. In-person debriefing versus mail or telephone contact often elicits more detailed and useful information from the respondent.

Abt Associates will conduct pilot tests with fewer than 10 respondents, as this will not require OMB clearance. We plan to conduct this pilot test with practices that vary according to size, specialty, and practice type (group or solo) in order to ensure that the instrument functions equally across all practices.

It is important to note, however, that although pilot testing the survey can prove to be a very worthwhile endeavor, the review of the survey by the TEG members and HCFA staff will provide invaluable input to final development of the survey instrument. Based on the pilot test, TEG member input, and comments from the Project Officer and HCFA staff, Abt Associates will finalize the questionnaire.

3.0 SURVEY ADMINISTRATION

A sample of approximately 5,000 group and solo physician practices, and an estimated 400 to 500 non-physician practices (podiatrists, optometrists, clinical psychologists, and physical therapists) will be selected for participation in the Survey of Practice Costs. Our initial contact with the practice will be a letter mailed to the practice administrator. This will be followed by a telephone call that will determine eligibility, identify the appropriate point of contact for the survey, and identify potential nonrespondents so that we can begin to address their concerns early in the survey process. For practices that are agreeable in the initial call, the third step will be mailing the self-administered questionnaire to participating practices. It is anticipated that approximately 4,300 of the physician practices will be eligible to receive a questionnaire. We will strive to achieve a completion rate of 70% of eligible physician practices, which would yield an estimated 3,000 completed cases.

The questionnaire will request information about practice costs and will request case-mix data on machine-readable diskettes. An 800 number will be available to respondents for technical or administrative questions that they may have. The questionnaire will contain a date by which we expect the return of a completed questionnaire, and practices that do not respond by this date will be contacted again. Questionnaires that have been mislaid will be replaced by mail. Although the questionnaire is designed to be self-administered, if necessary, we will conduct a telephone interview to obtain the desired information. Completed questionnaires will be carefully edited for missing or inconsistent information. Practices that did not supply complete information or supplied erroneous information will be recontacted to supply missing data or clarify any ambiguities.

3.1 ADVANCE LETTER

The survey will be initiated by mailing an advance letter and information packet to approximately 5,000 group and solo practices selected for the sample. All mailings to sample members will occur at the same time in order to improve the efficiency of the research design. This information introduces sampled respondents to the study, and the package will be designed to achieve several key objectives. The advance letter will:

- Explain the purpose of the survey and the respondent's role, and assure the respondent that we will adhere to rigorous standards of confidentiality;
- Explain the Congressional Mandate for this study to develop a resource-based system for determining practice expense relative value units for each physician service;
- Explain the Federal sponsorship of the study;
- Emphasize support obtained from the health care community by including copies of endorsement letters from professional societies in the packet;
- Provide an overview of the data that are being solicited, accompanied by clear, concise explanations of why these data are needed.

The letter will be personalized and based on one of two models: one for a physician who heads a practice, a second for the administrator of group practices. Respondents will be provided a toll-free telephone number and will be encouraged to call Abt staff with any technical or procedural questions. All calls to the toll-free line will be handled by a member of the project research team.

Sending an advance letter to sample members assists us in the survey administration process by introducing potential respondents to the study, preparing them for a telephone contact from one of our Survey Coordinators, and assuaging concerns that they may have surrounding issues of confidentiality. Moreover, postal returns of advance letters with forwarding address information will allow us to update address information for those practices that have moved.

3.2 ELIGIBILITY

Within two to three days of the advance letter mailing, an Abt Associates Survey Coordinator will place a telephone call to the designated respondent. The purpose of the call is to draw attention to the letter and information packet, to encourage cooperation in the survey, and to verify eligibility of the group or solo practice by asking several questions. First, we will determine whether the practice has been in business for at least one year. Practices in operation for less than a year are likely to have unusual expenses related to start-up and, for this reason, we suggest such practices be considered ineligible for the study. Second, if the practice has only one physician, we will determine whether the physician spends at least twenty hours a week in direct patient care. We suggest that solo practitioners working less than 20 hours per week should be considered ineligible for the study. Third, we will determine if the practice has any doctors that are salaried employees. We suggest that such practices should be declared ineligible for the study. Fourth, we will determine if the practice has indirect costs. Practices with no decipherable indirect costs are unable to provide relevant data for the scope and purpose of the study and, therefore, should be declared ineligible for participation. Finally, we will determine if the practice can provide us with case-mix data. If the practice has no means of breaking down its volulme by HCPCS codes, then the we suggest that the practice be declared ineligible for the study. We estimate that roughly fourteen percent of the sample (700 practices) will be declared ineligible based on these criteria, thus reducing the eligible sample size to approximately 4,300 group and solo practices.

Once eligibility is verified, the Survey Coordinator will ask who in the practice will be responsible for gathering the data needed by the study. If follow-up calls are needed (which is expected in the majority of cases), the Coordinator will contact this person (or persons) directly, expediting the survey process.

3.3 FIELDING THE SURVEY

We expect that contacting the sample by mail and by telephone, before the questionnaires are mailed, will help to prepare respondents in a way that will enhance their receptivity to the

survey goals, maximize their cooperation and response rates, ensure data quality, and minimize survey costs. Also, these procedures will identify any incorrect addresses and phone numbers in the data base. If an address is no longer valid, the US Postal Service will notify Abt that the address has changed, and provide the new address, if it is available. Intensive locating procedures will be initiated whenever Postal Service updates are not provided. Similarly, if a phone number has been changed, the survey staff will carry out locating procedures as necessary to obtain current information.

Questionnaire packets will be mailed to an estimated 4,300 eligible group and solo practices in one mass mailing. Receipt of completed forms will be recorded on a daily basis in our Survey Management System database. Each practice that has not returned a questionnaire by the end of a specified period of time will be contacted either by mail or by telephone.

3.4 NON-PHYSICIAN SAMPLE

In addition to the sample of approximately 5,000 group and solo physician practices, HCFA would also like to include a smaller sample of non-physician practices to participate in the study. The details of the exact number of non-physician groups that will participate and the anticipated sample size need to be confirmed, but we anticipate that an approximate sample of 400 to 500 practices, representing an approximately comparable number of practices, will be drawn across four non-physician specialties (Optometrists, Podiatrists, Clinical Psychologists, and Physical Therapists). The survey administration procedures and the data collection time schedule for this group of non-physicians will remain identical to the primary sample of physicians.

3.5 AUTOMATED SURVEY SYSTEMS

Based upon our experiences with other projects that involve large numbers of mailings and telephone contacts, we propose to implement an organized system to handle the needs of this survey project. This system would allow us to:

- load and maintain the sample of medical practices;
- print labels for the mailings of advance letters and questionnaires;

- update address and telephone information for sample members;
- produce daily schedules of cases to be contacted by telephone;
- enter screener information and comments on initial telephone contacts;
- keep track of remailings;
- store information returned on diskette;
- track the flow of data, through the use of disposition (event) codes; and
- generate reports of project status.

The system will be developed within the parameters set down by the Project Director and Project Officer. Final system specifications will not be implemented until both the Project Director and Project Officer have observed and approved the functionality and utility of a prototype system.

3.6 SURVEY COORDINATOR RECRUITMENT AND TRAINING

The network of skilled interviewers already available to Abt will be supplemented by recruitment activities that attract candidates who are articulate, persuasive and conscientious. Candidates will be subjected to selection criteria that evaluate their ability to follow instructions scrupulously, motivate respondents to cooperate, provide appropriate technical assistance to aid respondents in carrying out their tasks, and capture all telephone-reported data accurately.

Survey Coordinators will be introduced to the study through a comprehensive training so they can understand the importance of accurate and complete responses, and a high rate of response. They will learn about physician practices, how they are organized and managed, and how records are maintained, so they can understand the perspective of the people they are interviewing.

The training is expected to take three days. During this time Coordinators will receive extensive training on the survey instrument and how to administer the survey by phone. They will also receive training on locating procedures and tactics as well as how to use the Survey Management System. The training will cover the safeguards that Abt maintains to protect the confidentiality of the data the respondents provide, so the interviewers can assuage concerns about access to data. Coordinators will be taught how to deal with the receptionist who screen the calls to the physicians and practice administrator, and how to identify the practice staff member who

maintains control of the data, so they can contact this person and get the information needed for the study. Coordinators will learn how to persuade respondents who refuse to provide information to cooperate in the study.

Throughout the training, Coordinators will practice what they have learned, to reinforce the lessons and to demonstrate their mastery of the material. Training will conclude with a comprehensive practice exercise, a mock case integrating all aspects of the training, followed by a comprehensive examination on the material, to ensure that the interviewers are competent and skilled. A review of the comprehensive exercise and examination will conclude the training.

3.7 SCHEDULE FOR DATA COLLECTION

Data collection is planned to last about five months from the initial mailout of questionnaires. This is a compressed time frame -- to ensure delivery of the Final Report on Data Collection and Data Delivery by the due date, thirteen months after Date of Award -- but sufficient time is provided to capture the required data and to develop final data sets and final reports on schedule. An important function of the receipt control/sample management system described above is the preparation of field reports that document progress against expectations of receipt of completed questionnaires.

3.8 TRACING AND FOLLOW-UP PROCEDURES TO CONVERT NONRESPONDENTS

Obtaining correct address and telephone information for sampled practices and effective efforts to persuade busy practices to take the time required for completing survey forms are both essential to the achieve the proposed response rate of 70% (approximately 3,000 completed surveys). Despite the accuracy of the address information in the AMA Physician Masterfile, we anticipate that there will be some effort devoted to locating physicians and depending on a variety of factors, both individual physicians and practices may change locations.

If an advance letter is returned to us with no forwarding address information, then the case will be turned over to telephone center staff for locating. Abt's tracing staff are trained to conduct specific searches, using sources such as state and local medical societies and state licensing

agencies for locating physicians and medical practices. Additional sources for locating include credit bureau checks, utility companies, directory assistance, and criss-cross directories, in order to successfully locate respondents.

3.9 SURVEY PROCEDURES TO MAXIMIZE UNIT RESPONSE

After the initial bulk mailing of questionnaires during the first week of data collection, we anticipate that approximately 75% of the eligible sample (3,225 physician practices) will need some form of follow-up. As an initial step, Abt will urge respondents to call the toll-free number with their questions and concerns. This channel is useful in promoting interaction with the respondent, but does not obviate the need for follow up phone calls from an Abt Survey Coordinator to facilitate a response. The toll-free number allows respondents to call in at any time to ask study-specific questions or to leave important information. The various types of calls received on this line will be fielded by an experienced Survey Coordinator trained to triage calls to appropriate help. The scope of these calls may range from a simple request to mail a second questionnaire, which can be handled by mail clerks, to sophisticated practice cost questions that may need the attention of the Project Director or the Principle Investigator. However, we anticipate that a majority of the calls will be limited to issues that can be addressed by either clerks, Survey Coordinators, or their supervisors.

Most non-respondents will not use the toll-free number that is provided to them. In this case, non-respondents will be contacted. We expect to begin prompting most non-respondents within two weeks after the survey was mailed. Prompting non-respondents will involve one of two strategies. The first strategy will be to have the Survey Coordinator telephone the contact person and determine if another survey needs to be mailed. Often the surveys will simply be overlooked or lost in the stacks of mail and they will need to receive another copy. Although the primary purpose of this call is to urge the respondent to complete and return the printed questionnaire, at this juncture the Survey Coordinator will be trained to assess the likelihood that the practice will complete a self-administered questionnaire, and will encourage the respondent to provide practice cost information over the phone, if this is a feasible alternative. Since it is not

feasible to obtain case-mix data by telephone, the Coordinators will encourage the practice to send case-mix data in on diskette, or by mail or FAX. Throughout the field period, Survey Coordinators will make additional follow-up calls to nonrespondents, and will mail replacement questionnaires as necessary. Those that need additional surveys mailed will receive a second questionnaire packet the next day. A second strategy is to mail a second questionnaire packet with a letter encouraging timely participation. If these respondents do not complete the survey within 2 to 3 weeks of the second mailing then Survey Coordinators will call the contact person and prompt them to complete the survey or, if necessary, they will obtain practice cost information by phone. Interviews completed by telephone will be coded to distinguish them from the questionnaires completed by physicians so that comparisons of method effect (telephone or self-administered) can be carried out during the analysis of survey data. We anticipate that most of the non-respondents will need a second questionnaire remailed to them. Similar studies conducted in the past have taught that if a completed questionnaire is not received within two weeks of the initial mailing, the instrument has probably been lost or discarded, or cannot be retrieved without inconvenience.

The strategy we adopt to follow-up on non-respondents and the time frame under which we begin the follow-up may depend upon several criteria such as size of practice, type of practice, or overall cooperativeness of the practice administrator. We hope to identify such criteria during the pre-test so that we can adopt the most effective follow-up strategies during the data collection period.

The design of the questionnaire itself is also an important factor in encouraging participation. Instructions for survey participation must be clearly and simply worded and the questionnaire itself must be easy to complete. The content and appearance of the package must be designed to persuade respondents that the survey is a professional research effort about a topic with considerable interest to physicians and a clearly evident commitment to quality and accuracy of data.

3.10 EDITING PROCEDURES

A data entry subcontractor will key-punch the survey instruments. Because the content of the questionnaire relies heavily upon attaining cost information, categorical responses are often inadequate. In order to obtain the exact information sought by this study it is imperative that most of the questions be non-categorical responses, that is, the questionnaire responses are primarily dollar amount figures that allow the respondent to write in any amount. Non-categorical responses require a rigorous system of edit checks relative to questionnaires based primarily upon categorical items. In an effort to minimize the burden upon themselves of extracting data from complex data systems, some respondents may send supporting documents that contain the answers to particular questions, rather than supplying the answer in the appropriate place in the questionnaire. Also, respondents may often write important, detailed comments on the pages of the questionnaire that supply critical information in determining the answer to the question. Data editors will be trained to look for responses that are clearly wrong. It may be that the respondent accidentally recorded the information incorrectly. In this situation, the questionnaire will be given to a Survey Coordinator who will call back the respondent and obtain the correct information. For questionnaires of this type, Abt has developed a set of standard editing procedures that are implemented before a survey is sent to data processing. In addition to the standard series of edit checks, discussed below, a series of more complex edit algorithms will be developed with the assistance of Entermedica, MGMA the Project Director, and the Project Officer. An example of such an algorithm might include cross-checking the value of one answer (i.e., Total salaries for Clinical Personnel excluding physicians) against the value or values of another variable or set of variables (i.e., the sum of the product of FTE by Average Hourly Wage for all Clinical staff excluding physicians should equal the total salary costs for Clinical staff). The combination of manual and computerized edit checks serve to insure that the data are internally consistent, accurate, and valid.

Those surveys that are returned with none of the information answered will be recorded as refusals and assigned to refusal conversion efforts rather than data entry. If the survey is partially completed, the editors will use both a list of critical survey items and a set of

predetermined criteria to determine if the survey can be passed along for edit checks or if a follow-up call to obtain additional data from the practice is needed. If a data retrieval call is needed, the instrument is sent to the supervisor of the telephone center to be assigned to a Survey Coordinator.

Completed surveys that are passed on for edit checks are reviewed by a trained staff before the surveys are processed. Editors receive detailed training, specific to each study, on performing edit checks on the survey instrument. The standard edit checks that a survey goes through include:

- the survey identifier (i.e., case identification number) is checked for accuracy;
- open-ended responses are checked for legibility, especially dollar amount figures (i.e., ensure that commas and decimal places are in their respective places);
- missing or blank data are assigned a special code;
- items with special instructions are checked to ensure directions (such as "check boxes") have been properly followed;
- data are examined for extreme outliers (which are scrutinized closely); and
- data from work sheets, forms or other supporting documentation that submitted with the questionnaire are extracted.

No editor will be permitted to begin production work until s/he has been certified by the project staff by passing a standardized assessment at the conclusion of the training period.

3.11 PROCEDURES TO ASSESS QUALITY OF MEASUREMENTS/CONTROL PROCEDURES

Because both mail surveys and telephone interviews will be used, the system of quality control procedures must be appropriate for both modes of survey response. The quality control for the mail survey will rely heavily upon assuring that the data returned from a respondent is an accurate representation of the physicians' practice. This can be best assured by training the editing staff to examine the questionnaires for evidence of likely respondent error ("suspect errors"). Respondents who complete the self-administered questionnaire will be asked to make a copy of

the completed survey form for their records. If an edit uncovers an inconsistency that only the respondent can resolve, the respondent's copy can be extremely helpful in clarifying the issue when a Coordinator calls the respondent.

3.12 CASE-MIX DATA

Practices will also be asked to supply case-mix data that reflect the number of times that a procedure, identified by an individual CPT code, is performed in that practice. We anticipate that this information will be readily available from most practices' billing systems. We will send a floppy diskette with the questionnaire so that this information can be provided electronically. We will have computer programmer support available for those individuals who have difficulty in extracting information from their computer system and downloading or copying it onto diskette. Once a diskette is received, it must first be checked to ensure that the case identifier exists on the file so that the procedure codes can be matched with all other practice data. Second, the file needs to be restructured by Abt's programming staff to a standard format from which will allow the data to be linked to the appropriate practice record in the data base. Once the file is in a standard format the data will be verified against the original file to ensure that the integrity of the data is maintained.

Each batch of case-mix information provided by a practice will first undergo a comprehensive manual review by qualified professional staff. Among other things, this review will establish whether the case-mix report appears to be [a] a comprehensive list of all counts for all procedures performed by the practice, [b] that the reports show unduplicated counts of procedures (or are in a format that permits Abt staff to carry out the un-duplication accurately), and [c] that data are aggregated to the appropriate level (CPT and practice). For example, in some cases practices may submit information separately for various CPT modifiers or for each physician in a practice. Follow-up calls will be placed to practices to alleviate concerns about either potential problem.

Once these issues are settled, case-mix data must be converted to machine readable form in an accurate, efficient manner that permits linking of this information to the questionnaire

database and other practice data. The data conversion process must be able to accommodate any form of reporting by the practice, including the extremely complex arrangements alluded to above. Given the demands for flexibility, we propose to handle data conversion with a Computer Assisted Data Entry (CADE) program organized in a relational database management system (RDBMS) model.

In an effort to develop a resource-based system for determining practice expense relative value units, this study proposes to obtain indirect practice cost information from a sample of approximately 5,000 group and solo physician practices in the form of a mail survey. Due to the ineligibility of some group and solo practices, we will strive to achieve a minimum of a 70% response rate for the estimated 4,300 eligible group and solo physician practices. Achieving such a high response rate from a self-administered survey will pose a significant challenge. However, we feel that there are two significant reasons why the study objectives will be achieved. The first reason is the efficiency and effectiveness of the survey administration procedures as outlined above. The methodological mix of mail survey and telephone follow-ups, as well as the implementation of a toll-free hotline, will all serve to increase response rates more so than any single methodological approach. The second factor is that physicians are likely to take a vested interest in completing survey information. The entire health care community will be focusing attention on this HCFA-sponsored project, thus bringing the attention of the survey to the forefront in the medical community. We anticipate that this will have a positive impact upon the overall cooperativeness of physician practices.

ATTACHMENT 1

DRAFT SURVEY OF PRACTICE COSTS

Abt Associates Inc.

SURVEY
OF
PRACTICE COSTS

General Survey Instructions

Your response to this survey is very important as it will help to develop estimates of physician practice costs. The data will be used to ensure that the anticipated changes in Medicare's reimbursement of physician practice expenses accurately reflects the actual costs incurred by physicians' practices.

All data collected in this survey will be treated as confidential. Individual respondents will not be identified as your answers will be combined with others and reported only in aggregate statistical form.

This survey should be completed by office personnel with the most knowledge regarding physician practice costs, including case-mix data, revenue information, clinical practice and support costs, and general practice information. Specifically, this survey contains the following sections:

Section I:	Practice Case-Mix Data	Page 1
Section II:	Direct Patient Care Costs	Page 2
Section III:	Indirect Practice Costs	Page 3
Section IV:	Practice Information	Page 6
Section V:	Summary Information	Page 7

If you have any questions about the survey, please contact Pat Smith at:

Abt Associates Inc.
101 North Wacker, Suite 400
Chicago, IL 60606
PH 800-XXX-XXXX
FAX 312-621-3840

For purposes of this survey, a "practice" includes all offices serviced by a physician or physicians. Thus, solo practioners should incorporate all locations that he/she practices medicine, and group practices should incorporate data from multiple sites where each physician in the group practices medicine.

Data captured in all sections of this survey should reflect activities and practice costs incurred during the last complete fiscal year (if unable to complete for an entire year, please call 1-800-XXX-XXXX).

Prepared by Abt Associates Inc.

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE CONTINUING

1. Please answer all questions as completely as possible. You may send supporting documentation such as payroll listings if they assist you in answering questions. Be sure to label any additional information with the practice name and the 7 digit identification number located on the front of the survey.

2. Please DO NOT leave any lines BLANK. If no costs were accrued for a particular line item, then please place a "0" on the appropriate line. If a particular line item is NOT APPLICABLE to your practice, then please write "NA" on the appropriate line. This lets us know that the item was NOT overlooked.

3. Some questions have checkboxes at the end with the word "data" next to it. For these questions, if your answers are based on *actual* data rather than an estimate, please put a check mark in the box.

4. Please make a copy of the completed questionnaire and any additional information that you have chosen to include with the survey. In case there are any questions once you have mailed back the survey, it will be helpful if you have a complete copy of the documents.

5. We encourage you to use the enclosed diskettes to provide case-mix data (Section I). It would be extremely helpful if you can provide this information in an electronic format. See Section I for specific instructions.

6. Document the time that it takes you and your staff to complete the survey. This should include the time needed to answer any survey questions, to retrieve data, or to complete any computations. This should be reported on last page of the survey.

7. Please use a pen in completing the survey.

8. A postage-paid return envelope is enclosed for your convenience. Please call Pat Smith at 1-800-XXX-XXXX if you have any questions.

DUE DATE: MM/DD/YY

THANK YOU IN ADVANCE FOR YOUR COOPERATION

Prepared by Abt Associates Inc.

I. Practice Case-Mix Data

The data requested in this section are necessary in order to assist us in assessing the impact of proposed practice expense reimbursement options on medical practice.

1. **For each CPT-4 performed by your entire practice, please provide the frequency with which it was performed. Refer to the last complete fiscal year reported in Section II.**

   - The entire case-mix for your practice should include surgical, diagnostic, and evaluation & management services. We do not need any breakdown by payor.
   - It would be extremely helpful if you can provide this information in a **computerized format**, as described below.
   - If you are absolutely unable to provide your case-mix data in a computerized format, please provide it in a printed computer report, or legible handwritten format. See specifications below.
   - If there are multiple physicians in your practice, please provide the data in a form which summarizes the case-mix for all of the physicians, rather than supplying separate reports for each physician.
   - Where relevant, provide separate frequencies for services billed as professional, technical and global components. Other modifiers should be combined into aggregate CPT-level frequencies.

   A. Preferred Guidelines for Submitting Electronic Medium:

   - IBM-compatible diskette (3.5 or 5.25 inch)
   - Spreadsheet (e.g., Lotus, QuatroPro, Excel), database (e.g., DBASE, Paradox), or ASCII format
   - The CPT code and the number of times the procedure was performed must be in 2 separate fields
   - If you cannot provide the data in the formats mentioned above, we would still prefer it in an electronic medium. Please call the number listed below with any questions you may have.
   - Label all materials with format information, practice name, and ID number (see front of questionnaire)

   B. Preferred Guidelines for Submitting Hard-Copy Medium

   - Printed computer report, typed, or legible handwritten format
   - List data in ascending order of CPT code

If you have any questions regarding our request (including questions about sending the data in computerized format) for your practice's case-mix, please call Pat Smith at 800-XXX-XXXX.

II. Direct Patient Care Costs

In the following section, please report practice costs incurred during the last complete fiscal year.

Costs reported on this page are for ***direct costs only***. This includes all costs associated with providing **clinical** services. Administrative and clerical staff should not be included unless they also perform some clinical tasks. In this case, allocate the relevant proportion of their time to clinical costs.

1. **Dates of Fiscal Year:** Please refer to this time period for **all** remaining questions. (If unable to complete for an entire year, please call 1-800-XXX-XXXX).

From ____/____/____ To ____/____/____
mo day yr mo day yr

	Clinical Practice Costs
2. **Clinical personnel excluding physicians:*** (Employees directly involved in patient care such as nurses, physician/medical assistants, and lab/x-ray technicians or relevant proportions of administrative or clerical staff who perform some clinical work.)	
Salaries (TOTAL)	$________
Fringe Benefits (TOTAL) (Fringe benefits include items such as employer Social Security/Medicare contributions, workmen's compensation, employee health/disability insurance, or employee retirement.)	$________
3. **Medical equipment costs:**	
Purchased equipment (If a piece of equipment is expensed in a single year, please include the purchase price and maintenance costs of the equipment when reporting total medical equipment costs for the practice. If the equipment is expensed over more than one year, include only the annual depreciation, interest and maintenance costs or service contracts for the item. The purchase price should not be included in the costs for equipment expensed over multiple years.)	$________
Leased equipment (include annual rent and maintenance costs) . . .	$________
4. **Medical supply costs:** (include only those medical supplies not resold to an outside party)	$________

If any personnel perform both clinical and non-clinical functions, allocate their costs between direct (clinical) functions and support (non-clinical) functions according to the proportion of time spent in each.

III. Indirect Costs

Please provide indirect practice (non-clinical) costs incurred by the practice during the last complete fiscal year. Exclude any physician expenses which are not reimbursed by the practice.

- Do not report clinical costs (clinical staff, medical equipment or medical supplies)
- If it is difficult to allocate costs to the listed categories, you may supply only the total cost provided that it includes only the itemized costs in question 8.

Total Costs

1. **Facility costs** (e.g., office rent, depreciation and interest, utilities, maintenance) $__________

2. **Non-medical supplies and equipment** (e.g., annual lease, depreciation and interest, and maintenance costs for office equipment such as computers, furniture and copiers; software; office supplies; car upkeep/depreciation) $__________

3. **Professional liability insurance premiums for non-physician staff** (Do not include liability insurance premiums for physicians unless it is impossible to segregate them - in which case, provide the total practice premium and check this box ☐) . . . . $__________

4. **Other professional costs for physician and non-physician staff** (e.g., professional dues/licenses, continuing medical education) . . . . $__________

5. **Support personnel costs** (include salaries and fringe benefits of office/administrative staff or relevant proportion of clinical staff if part of their time is spent on administrative responsibilities. This may include receptionists, scheduling and medical secretaries, medical records personnel, database personnel, clerks, cashiers, insurance or billing personnel.) . . . . $__________

6. **Other administrative costs** (include costs for any outside legal or office management services, payments to a billing service and/or collection agency, or other non-physician insurance premiums)* . . . . $__________

7. **Other costs not listed above (*please specify*)*:**

   ______________________________ $__________

   ______________________________ $__________

8. **TOTAL INDIRECT COSTS** (Please explain if this total does not equal the sum of 1-7 above) $__________

NOTE*: *Do not include costs incurred for research activities. Do not include physician salaries as they are reimbursed through a separate (work) component of the fee schedule.

IV. Practice Information

1. **For each procedure listed in the columns below, identify the percent of procedures that are performed in the settings listed in the first column. Percentages should be based on the last complete fiscal year and on the annual procedure counts that are provided in Section I.**

	Anesthesiologic Procedures	Surgical Procedures	Radiological Procedures	Laboratory Procedures	Evaluation and Management	Other Diagnostic Tests
a. Hospital Inpatient	____%	____%	____%	____%	____%	____%
b. Hospital Outpatient (includes ER)	____%	____%	____%	____%	____%	____%
c. Office	%	%	%	%	%	%
d. Other (SPECIFY) ____________	____%	____%	____%	____%	____%	____%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

2. **How many full-time equivalent (FTE) physicians are associated with this practice in each of the following specialties?**

	Number of FTE
Allergy & Immunology	________
Anesthesiology	________
Cardiology	________
Dermatology	________
Diagnostic Radiology	________
Emergency Medicine	________
Family Practice	________
Gastroenterology	________
General Practice	________
General Surgery	________
Internal Medicine	________
Neurological Surgery	________
Neurology	

	Number of FTE
Obstetrics & Gynecology	________
Ophthalmology	________
Orthopedic Surgery	________
Otolaryngology	________
Pathology	________
Pediatrics	________
Plastic Surgery	________
Psychiatry	________
Pulmonary Diseases	________
Radiology	________
Cardiothoracic Surgery	________
Urological Surgery	________
All Other Specialties	

	Number of FTE
Audiologists	________
Certified Registered Nurse Anesthetists (CNRAs)	________
Chiropractors	________
Clinical Psychologists	________
Clinical Social Worker	________
Dentists	________
Optometrists	________
Occupational Therapists	________
Physical Therapists	________
Podiatrists	________

3. **What percentage of physicians' time is devoted to activities related to....**

a.	Continuing medical education.	______%	☐ Data
b.	On call or stand-by (not actually providing patient care).	______%	☐ Data

4. **Indicate the total number of full-time equivalent (FTE) personnel in each of the categories listed below using the following guidelines. If you cannot distribute your personnel into the listed categories, fill in only the *total* category for Sections II and III.**

- Do **include unpaid personnel** in your FTE counts. For each personnel category, indicate the average hourly wage rate (defined as yearly salary and bonuses divided by number of hours worked for salaried employees) of all paid personnel.
- If an employee performs multiple functions, include him or her in the category where **most work** is performed.
- Please attach an **employee salary list** if it indicates categories and time worked (full-time or percentage thereof) for each employee.
- If your practice operates multiple sites, include personnel for **all locations**.

	Number of FTE	**Average Hourly Wage (Without Fringe)**
I. Clinical (non-physician) Personnel: (This should include activities required for direct patient care; exclude personnel involved solely in research)		
a. Registered Nurses	___	$_________
b. Licensed Practical Nurses	___	$_________
c. Physician Assistants	___	$_________
d. Technicians (e.g., x-ray, ultrasound, lab technicians)	___	$_________
e. Other (please specify): ______________________	___	$_________
f. Other (please specify): ______________________	___	$_________
g. Other (please specify): ______________________	___	$_________
h. **TOTAL CLINICAL PERSONNEL** (Please provide the average hourly wage for all FTE)	___	$_________

II. Administrative or Clerical Personnel

(This should include activities required in support of patient care; exclude personnel involved solely in research)

a. Medical secretaries	___	$________
b. Scheduling secretaries	___	$________
c. Receptionists	___	$________
d. Insurance/billing personnel	___	$________
e. Medical records personnel	___	$________
f. Database personnel	___	$________
g. Housekeeping	___	$________
h. Security	___	$________
i. Administrative/management	___	$________
j. Other (please specify): ________________	___	$________
k. Other (please specify): ________________	___	$________
l. **TOTAL ADMINISTRATIVE/CLERICAL PERSONNEL** (Please provide the average hourly wage for all FTE)	___	$________

For questions 5-7, please provide your best estimate based on the last complete fiscal year (as reported in Section I). You are not required to consult written records. If, for any of these questions your estimate is based on actual data, please check the box at the end of the question.

5. What percentage of administrative or clerical staff's (as defined in Question 4) total time is devoted to activities related to...

a. Office patients (e.g., scheduling tests, record keeping).	______%	☐ Data
b. Patients not seen in the office (e.g., scheduling hospital services, processing insurance forms, for patients treated or seen in ER, OR, hospital consults or other settings outside of the office).	______%	☐ Data
c. Non-patient care support (e.g., maintaining outcomes data bases, OSHA training).	______%	☐ Data
TOTAL	**100%**	

6. In a typical month, what percentage of patients....

a. Cancel appointments and must reschedule?	______%	☐ Data
b. Are "no shows"?	______%	☐ Data
c. Must be rescheduled because physician is not available (e.g., an operation or visit that lasts longer than expected)?	______%	☐ Data

7. Is this practice....

Yes **No**

a. An academic practice (including residency programs)?	1 . . . 2
b. An HMO (staff model)?	1 . . . 2

For questions 8-12 include **all** practice sites. If a room in your office is used for examining and procedures, include it in both question 9 and 10.

8. If your practice includes multiple sites, please provide the number of sites.

______ number of sites . . . . ☐ one site

9. How many examining rooms does your practice furnish?

_______ examining rooms

10. How many procedure rooms does your practice furnish?

_______ procedure rooms

11. How many square feet does your practice occupy?

_______ square feet

12. Does your practice lease or own the space in which it is located?

Own 1

Lease 2

V. Summary Information

1. **Please indicate the time that it took you and your staff to complete the survey. This should include the time needed to answer any survey questions, to retrieve data, or to complete any computations.**

_________ minutes

2. **In completing this survey, did you rely...**

a. Primarily on Computerized Records 1

b. Primarily on "Hard Copy" Records 2

c. About Equally on Both Types of Records 3

3. **Please provide the following information.**

Physician Name/Practice ____

Survey Respondent ____

Other Contact Name __________________________________

Survey Respondent Phone Number (______)________________________________

Survey Respondent Fax Number (______)________________________________

Thank You

Data Collection and Analysis for Generating Procedure-Specific Practice Expense Estimates

HCFA Contract No. 500-95-0009

Briefing Paper #4

Collection of Input Price Data to Calculate Service-Specific Direct Cost Estimates

May 24, 1995

Abt

Abt Associates Inc.

Prepared by Abt Associates Inc.

1.0 INTRODUCTION

This paper explains Abt's approach for the collection and application of input price data to calculate direct practice cost estimates for individual services. The sources from which these data will be obtained and the steps that will be implemented to verify the reasonableness of the price data which are compiled will be described in Section 2.0. A discussion of how these input prices will be used to generate service-specific direct cost estimates follows.

Direct inputs are defined as those inputs which are easily and unambiguously attributable to the *provision of a particular service*. Labor (wages and fringe), medical supplies and equipment are the primary categories of direct inputs that are typically used in performing medical services. Abt project staff will convene a series of Clinical Practice Expert Panels (CPEPs) to develop detailed profiles of the direct inputs required in providing reference services, which have been identified from resource- and clinically-homogenous service families.[1] These panels will supply data on the time that different practice staff spend on activities associated with performing these services and the types and number of medical supplies and equipment used during each service.

The profiles of the quantities of direct inputs for each reference service prepared by the CPEPs will subsequently be converted into dollar cost estimates. Accomplishing this requires that prices be assigned to each input identified by the CPEPs. Abt staff will use several sources to collect data on input prices, including staff wages and supply and equipment costs. Data on wages and fringe will be compiled from the survey of medical practices and compared with data from national databases with information on salary levels of several health care occupations. Collection of these data through the survey is important to the extent that staff in physician offices may have different training, experience, and job responsibilities that are not captured in national-level data. Prices on medical supplies and equipment will be obtained from the CPEPs. These data will be

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[1] The Clinical Practice Expert Panels, composed of physicians, administrators, and other clinicians, will be assigned service families which consist of services that are resource- and clinically-homogenous. Representative reference services will be selected from each family, and CPEP members will be asked to complete standardized worksheets designed to summarize information on the resources required to provide each reference service in different settings (e.g., physician office, hospital, and ambulatory care setting).

supplemented with data from supply and equipment manufacturers, large purchasing cooperatives, and medical device registers.

One very important question to consider in setting reimbursement rates is how to choose a single value of practice expense upon which reimbursement rates will be set. For many inputs, there is likely to be a range of prices which practices pay. These price variations can often be attributed to the scale of the practice and the mix of services it provides. For instance, a larger practice which uses greater quantities of supplies and equipment is likely to receive volume discounts in its purchases and make more efficient use of resources, such as equipment. Therefore, in estimating a unit price for these inputs, it will be necessary to choose a value from a range of prices that is representative of a practice of a certain level of efficiency.

Once the data collection of input prices has been completed, these input prices will be multiplied by the quantity of each input to derive direct cost estimates for each service. While the application of input price data to estimates of resource usage for supplies and labor is relatively straightforward, it becomes more complicated when computing the equipment costs associated with each service. Details of the direct cost calculation and the variables that must be considered in assessing equipment costs are discussed further in Section 3.0.

2.0 INPUT PRICE DATA COLLECTION

As explained above, Abt staff will collect data on direct input prices, including staff wages and supply and equipment costs, which will be combined with the resource profiles developed during the CPEPs, to generate service-specific direct cost estimates. In this section, Abt's strategy for collecting these data and the different sources from which these data will be compiled are discussed.

2.1 LABOR COSTS (WAGES)

Labor expenses consist of two primary components: employee wages and fringe. To value these labor inputs, Abt will obtain estimates of annual salaries and fringe from the survey of medical practices and from national surveys which collect statistics on the compensation of

health care professionals. These data will be applied to the staff time requirements specified in the resource profiles, developed by the CPEPs, to compute the direct labor costs associated with providing specific services.

Several secondary sources will be used to compile wage data on practice staff. For nursing wages, at least two sources will be used. The 1992 National Sample Survey of American Nurses, conducted by the Department of Health and Human Services, provides data on the average annual earnings of registered nurses employed full-time for various settings (e.g., ambulatory care, hospital, etc.) and for various positions (e.g., administrator, supervisor, consultant, head nurse, staff nurse, clinical specialist, etc.). In addition, the 1994 National Survey of Hospital and Medical School Salaries, conducted by the University of Texas Medical Center, includes salaries of nurses by facility type (e.g., hospitals, medical schools, and medical centers), size (number of beds), geographic census region, and nurse type (e.g., registered nurse, staff nurse, and professional nurse practitioner). Salary ranges, weighted averages, and medians for these categories of nurses are calculated.

Wages for other health care professionals (e.g. technicians, physician assistants) will be obtained from the Bureau of Labor Statistics' (BLS) Employment Cost Index Survey. This database has annual data on employer costs per hour worked for several health services occupations. Wages and salaries are represented as cost per hour, with costs identified separately for various types of benefits.

The use of these databases is limited, however, to the extent that these national surveys may not represent the wages and benefits of staff who work in physician offices. Staff in these offices may have different job responsibilities than otherwise comparable workers or may have a different level of experience that is valued by the employer. Therefore, the labor prices compiled from these secondary sources will be supplemented by data from the practice-specific surveys. The survey will ask practices to specify the hourly wage (excluding fringe) for major categories of staff and to indicate the number of full-time-equivalent (FTE) employees in each

category.[2] It will also solicit information on the total salary and total fringe levels for non-physician practice employees. Abt project staff will subsequently calculate the ratio of fringe to salary costs and average this ratio across the sample practices to determine an appropriate "markup" to apply to the hourly wages to account for fringe expenses.

The wages reported in the survey data will be compared with those contained in the national databases to determine if there are any significant discrepancies and to verify the reasonableness of the survey data. For those types of staff for which publicly available data do not exist or are insufficient, Abt will compute ratios of average wages for the various staff categories (e.g., ratio of RN to LPN wages), using the survey data. These ratios will then be used to extrapolate from the staff wages which are available in the other data sources. For example, if the databases have inadequate data on Licensed Nurse Practitioners (LPNs), the ratio of LPN and RN salaries can be determined from the practice-specific survey data and applied to the summary estimates of RN salaries, which are available in the databases, in order to obtain alternative estimates of average LPN hourly wage rates that can be compared to the survey data.

2.2 MEDICAL SUPPLY PRICES

The costs of medical supplies must also be taken into account in estimating the total direct costs associated with providing services. Supplies are typically considered a direct cost in that they can generally be linked to the provision of a particular service. As noted previously, the CPEPs will use standardized worksheets to enumerate the type and quantity of supplies used in performing the reference service from each family. In addition to providing these data, CPEP members will be asked to indicate the unit price that they pay for each type of supply.

Since certain physician groups are able to secure discounted prices by purchasing large quantities of supplies through group purchasing organizations, there is likely to be a wide

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[2] The survey will collect these data for the following types of clinical staff: registered nurses, licensed nurse practitioners, physician assistants, and technicians (e.g., x-ray, ultrasound, laboratory). Wage, fringe, and FTE data will also be compiled for the administrative staff including: medical and scheduling secretaries, receptionists, insurance/billing personnel, medical records personnel, and managers/office administrators. Respondents will have the opportunity to provide these data for any other staff that are used in providing services to patients.

distribution in the prices reported by the CPEPs. Therefore, in order to understand the frequency with which practices of various types and sizes negotiate such discounts, Abt staff, in conjunction with the Center for Research in Ambulatory Health Care Administration (CRAHCA), one of the subcontractors for this project, plan to identify and contact some of the larger purchasing cooperatives to obtain additional data on the supply prices and discounts that they secure with suppliers. These data will be compared with the prices provided by the CPEPs for various types of practices. In addition, major supply manufacturers will be contacted to discuss the various purchasing arrangements that they offer their customers and to determine what types of volume discounts are given to practices of various size. For instance, large, urban practices that perform a substantial number of services and, therefore, purchase greater quantities of supplies may be more likely to obtain volume discounts than rural practices with a limited number of patients and casemix.

Volume discounts are important to consider in determining the "typical" price for supplies to the extent that these discounts can result in over- and under-payment of practice expenses for different-sized practices with various levels of casemix. Practices that receive larger discounts will be overpaid relative to those that pay list price or do not receive large discounts. Given the information needs required to estimate precisely actual supply costs by service across a wide range of practice sizes and casemix, Abt and HCFA staff will establish an appropriate policy for determining the prices to use in developing per-service supply costs. Ultimately, Abt will be able to validate this estimate by examining estimated supply costs (averaged per service) for the practices that are surveyed.

2.3 MEDICAL EQUIPMENT PRICES

The development of direct cost estimates must also include the costs of the medical equipment used in providing services. As noted previously, in addition to providing estimates of resource usage for labor and supplies for each reference service, the CPEPs will provide important information on the equipment required to perform each of these services, including the purchase price, maintenance costs, and useful life of the equipment. These data will be combined with

estimates of the time the equipment is used for each reference service and utilization rates to generate per-service equipment costs, as will be discussed Section 3.2.

The purchase price estimates, supplied by the CPEPs, will be verified with data available through references such as the Medical Device Register and the Health Devices Sourcebook. However, the costs from these sources represent the full, undiscounted list prices, which are rarely paid by most practices. As in the case of purchasing supplies, certain practices are able to negotiate reduced prices for equipment. Therefore, in order to make the data from these references comparable with the equipment prices supplied by the CPEPs, Abt staff will contact major equipment manufacturers to determine what types of discounts they offer practices of various size. These discounts will then be factored into the list prices, compiled from these secondary sources. In addition, Abt staff will solicit data on equipment prices from the same group purchasing organizations that provided data on discounts for supply purchases. These data and the adjusted list prices, derived from secondary sources and discussions with manufacturers, can then be used to assess the validity of the equipment prices reported by the CPEPs.

3.0 APPLICATION OF INPUT PRICE DATA TO RESOURCE PROFILES TO PRODUCE SERVICE-SPECIFIC DIRECT COST ESTIMATES

The CPEP process will have produced detailed profiles of the quantities of direct inputs for the reference services from each family that must be converted into dollar cost estimates for each of these services through the application of input price data. This section describes how Abt will incorporate the input price data into the calculation of direct cost estimates for each reference service.

3.1 CONSTRUCTION OF SERVICE-SPECIFIC DIRECT COSTS

To develop per-service direct cost estimates, each input identified by the CPEPs will be assigned an appropriate price, as determined by the data collection process described in the previous section. These prices will then be multiplied by the quantity of the input to arrive at the cost of that input for each service. The resulting input costs will then be summed for all the inputs for each service in order to estimate the total service-specific direct cost as follows:

$$C = \Sigma_{i=1}^{n} p_i q_i$$

where;

C = Estimated direct cost for the service
p_i = The input price for input i
q_i = The input quantity of input i

Since the p_i will come from a combination of price data provided by the survey of medical practices, the CPEPs, national databases, and other sources and the q_i will come from the resource profiles developed by the CPEPs, these direct cost estimates will not be practice-specific. For labor and supplies, the interpretation of the expression above is fairly straightforward to the extent that reliable price data can be compiled and applied to the quantity estimates. For equipment, the definitions of the input price and quantity are more complicated, and will be discussed further below.

In practice, the matching of the input prices to the input quantities will present some difficulties, and several issues need to be addressed to complete this task effectively. The list of inputs for a service can be very lengthy and detailed, particularly for procedural services. When assigning prices to the list of inputs, three sources of variation will be considered:

- Variation in the price paid for identical inputs;
- Variation in type of input from one practice to another; and
- Variation in the specific inputs used from one service to the next.

In general, an RBRVS payment system requires that these variations be handled by estimating prices for the typical or average practice. The issues involved in achieving typical estimates and our proposed approach for achieving them are discussed next.

3.1.1 Variation in Price for Identical Inputs

The study of resource requirements for practice expenses requires the use of national average prices. Therefore, all cost calculations for this study will be done at average national levels; any adjustment for local area differences in cost of living are achieved in the MFS through the application of Geographic Adjustment Factors (GAFs) to the relative value units. Average wages for health care professionals will be derived from the survey of medical practices and national databases. These wage rates can then be easily applied to the labor times generated by the CPEPs to produce estimates of the direct labor costs for specific services. Equipment and supplies are purchased in national markets; therefore, geographic price variations can be ignored. However, price variations due to purchasing scale and/or leverage (e.g., volume discounts) will exist, as discussed in the prior section. In a budget-neutral implementation of resource-based practice expense RVUs, over- or under-estimating the typical equipment and supply prices will inappropriately over- or under-pay (respectively) those practices that extensively use supplies and equipment.

As explained previously, estimating typical price levels for these inputs will be achieved by comparing price data from multiple sources: the survey of practice costs, the CPEPs, national databases, large group purchasing cooperatives, and major equipment and supply manufacturers. Sound judgement and policy decisions will need to be implemented to arrive at the specific price levels to use. Achieving statistically valid representativeness for input prices is not feasible due to the scale and burden that would be required to survey this information adequately.

3.1.2 Variation in Type of Input from One Practice to the Next

Variations in inputs from one practice to the next can be very significant for those services which require use of high-cost equipment and supplies. These variations can generally be attributed to the fact that practices tend to use a wide variety of equipment, with different capabilities and costs, in providing services to patients.

The CPEPs will be useful in identifying the range of inputs regularly used by practices, in assessing quality differences that may exist, and in coming to consensus on the appropriate

configuration of inputs required for specific services. The composition of the CPEPs will be carefully structured to include the different specialties that perform the services within each family to ensure that a representative consensus is achieved on questions pertaining to the resources that are typically used in providing services.

3.1.3 Variation in Type and Quantities of Inputs Used from One Service to the Next

Variations in the specific inputs required to provide different services will be important in extrapolating the costs from the reference services to all the other services in each family. It is clear that although Abt staff will work in conjunction with the CPEP Technical Expert Group to develop resource- and clinically-homogenous service families, there will be some variability in the direct costs among the services within families. The individual CPEPs will address this issue in two ways. First, one criterion for selection of reference services will be that the reference service be typical or "representative" of the direct costs of all of the services in a particular family. Second, the CPEP's will review each service family to identify individual services for which the assumption of comparable costs is not reasonable. For the services so identified, an adjustment factor will be determined by the CPEPs, such that the direct cost for the service will equal the direct cost for the reference service times the adjustment factor.

3.2 DIRECT COSTING FOR EQUIPMENT

Estimating direct costs for equipment is one of the most challenging aspects of a resource-based approach to practice expense reimbursement. For most services, unit equipment costs represent a trivial portion of the total expenditures. However, for some procedures, notably many of those that are subject to technical component reimbursement when the service is provided in a physician's office, the equipment cost is a significant proportion of the total and must be measured carefully.

Equipment is usually a capital purchase with a useful life of more than one year, and there are a number of variables that must be considered with respect to determining the equipment costs for each service. As was discussed above, the type of equipment and the price paid for the

equipment will affect the per service cost estimate. In addition, the direct equipment cost for any one service code depends on the following:

- The volume of that service performed by the practice;
- The volume of other services performed by the practice on the same equipment;
- The useful life of the equipment;
- The financing terms of the equipment and its effect on the practice's tax liability; and
- Maintenance costs.

Abt staff propose implementing a methodology which is based on a discounted cash flow, net present value (NPV) investment model to calculate per-service, equipment-related direct cost estimates. These estimates will be used for technical components, and for other fees where appropriate. This modified approach involves a few simple steps:

- Using the average CPT-4 volume totals collected in the survey, and the mapping from CPT-4 codes to equipment, average total equipment volume will be calculated for each piece of equipment. The utilization percentage for the service being analyzed will be calculated as the average service volume divided by the average total equipment volume.
- The cash outlay for the purchase of the equipment for a service will be calculated as the purchase price (identified in the input price data collection), times the calculated utilization percentage. This outlay will be assumed to take place in "time zero," that is, the current period.
- A set of annual cash inflows, laid out over the course of the equipment's useful life, discounted to present value, and defined by the direct per-service cost amount times the average annual volume of that service, will be estimated. The per-service direct cost amount will be adjusted (by a computer algorithm) until the net present value of the equipment purchase is zero, producing the direct cost estimate for the service.

This approach will produce direct cost estimates which: i) use the data that is being collected in the study; ii) are easily calculated by computer algorithms; and iii) are based on sound economic

principles for annualizing multi-year capital expenditures. It could also be modified to address complicating factors such as the tax savings to the practice of debt financing, although inclusion of such factors would require collection of additional information through the CPEPs. In any case, Abt will explore the impact of various assumptions embedded in the description above. For example, candidates for "typical" or "appropriate" volume include the mean (over all practices in specialties that produce the service in any positive quantity), the mean of those practices which actually do produce positive quantities, the median (under either sample), and some estimate of maximum or "full capacity" output. Abt staff will examine the sensitivity of relative costs to other methods of defining the output denominator.

An alternative method for producing service-specific equipment cost estimates is to implement a straight accounting-based approach which does not consider the time value of the cash outlay for the purchase of the equipment. Using one variation of this approach, the service-specific direct cost estimate would be derived by calculating an annualized purchase price for the equipment, which would equal the equipment's total purchase price divided by its useful life (in years). The resulting annualized price would be multiplied by the utilization percentage for the service being analyzed to determine the share of the total equipment cost associated with that service. This figure would then be allocated across the total number of that service performed by each practice (and reported in the survey casemix data) to compute the equipment cost for that service for each practice. These cost estimates would be averaged across the sample practices to arrive at a single equipment cost to incorporate into the total direct cost estimates for each service. The advantages and limitations of each of these approaches will be assessed to determine which strategy is more consistent with the goals of producing reliable resource-based practice-expense estimates.

Data Collection and Analysis for Generating Procedure-Specific Practice Expense Estimates

HCFA Contract No. 500-95-0009

Briefing Paper #5

Procedure-Specific Data Collection: Classification System/CPEP Formulation

May 24, 1995

Abt

Abt Associates Inc.

Prepared by Abt Associates Inc.

1.0 INTRODUCTION

The project "Data Collection and Analysis for Generating Procedure Specific Practice Expense Estimates" is being funded by HCFA to provide an empirical foundation for a resource-based approach to measuring physician practice costs for Medicare Fee Schedule (MFS) services. The service-specific practice expense measurement will be accomplished through several steps:

- Creation of resource profiles (input requirements) for selected common individual services by Clinical Practice Expert Panels (CPEPs).
- Collection of standard input prices, which will be applied to the resource profiles to arrive at direct costs at the service level. These in turn will be extrapolated to all services.
- Computation of service-level direct costs from the resource profiles and input prices.
- Measurement of practice-level indirect costs via survey, and allocation of indirect costs to specific services.
- Addition of direct and indirect service-level cost estimates to arrive at resource costs for all Medicare Fee Schedule services.

The measurement of direct costs for selected reference services, and their extrapolation to all services, will be accomplished by the CPEPs, which are panels of clinical and practice management experts. This service-specific data collection is the subject of this briefing paper.

2.0 COLLECTION OF SERVICE-SPECIFIC RESOURCE PROFILES

Service-specific profiles will be developed from expert opinion and consensus. Creating a service specific profile involves identifying all of the appropriate resources that encompass the costs necessary to provide a particular service identified at the CPT-4 or HCPCS level. These resources include the clinical and administrative staff time requirements as well as all of the supplies and equipment necessary for provision of the service. In conjunction with HCFA, Abt project staff will convene approximately 12-15 CPEPs to develop the service-level resource requirements, which will form the basis for estimating the direct costs associated with physician

practices. Prior to convening the CPEPs, we plan to convene an additional panel, a CPEP technical expert group (CPEP-TEG). The CPEP-TEG will advise us on our approach to organizing the HCPCS-derived services into relatively homogeneous groups, referred to as service families, that will be assigned to the individual CPEPs. With between 6,500 and 8,500 services defined by the HCPCS coding system for which relative values must be estimated, only a subset of these services, which we refer to as "reference services" can be studied in the detail necessary for this project. The resources required for the remainder of the services will be extrapolated based upon these reference services. The CPEP-TEG will refine the families of service codes to be studied and will be responsible for identifying candidate reference services within each group. Each CPEP will finalize the list of reference services for which it will develop detailed resource profiles. The results of the CPEP process, along with collection of input price data, will allow estimation of direct costs and extrapolation of direct costs to the other services in each family.

In this paper, we discuss the preliminary classification scheme we have used to identify the service families and their assignment into CPEPs. In another briefing paper (paper #6) we discuss the implementation of the CPEPs and the CPEP-TEG, the process by which these panels will be operated, and the data collection efforts for which they will be responsible.

3.0 IDENTIFICATION OF SERVICE FAMILIES

Identification of service families will be a critical step in measuring the direct costs of fee schedule services. The basic strategy that will be used to determine direct costs for services requires that the CPEPs must define input profiles either directly or by extrapolation for all of the between 6,500 and 8,500 HCPCS services on the Medicare Fee Schedule. In order for the CPEPs to accomplish this task, the HCPCS codes must be grouped into exhaustive and mutually exclusive families of services which are clinically related and similar in resource requirements. For each such service family, a CPEP will select a reference service, which it will directly profile, "costing" the remaining services by extrapolation techniques. In order for this CPEP process to assign resource requirements to all services, service families must be grouped into CPEPs so that each CPEP is responsible for a set of related service families. The membership of each CPEP can then

be determined to match the types of service families for which it will be responsible. The steps necessary to arrive at CPEP composition and assignments, are discussed in detail next. We also present the results of our preliminary grouping analyses.

3.1 SERVICES TO BE GROUPED

Defining the specific set of service codes for which costs will be measured is an important issue that must be resolved. The HCPCS coding system has three levels, level 1 CPT-4 (numeric codes), level 2 alphanumeric national codes, and level 3 alphanumeric local codes. All HCPCS level 1 and level 2 codes[1] are designated by HCFA with a status indicator, which shows whether the HCPCS code is in the fee schedule, and whether it is separately payable if the service is covered. Of these 8,538 services with status codes, the following codes are currently used:

A= Active code (5,843 codes)
B= Bundled into another service (41 codes)
C= Carrier-priced (161 codes)
D= Deleted codes (134 codes)
E= Excluded from the fee schedule by regulation (437 codes)
G= Not valid for Medicare (29 codes)
H= Deleted modifier
N= Noncovered service (140 codes)
P= Bundled or excluded codes (107 codes)
R= Restricted coverage (482 codes)
T= Injections (4 codes)
X= Exclusion by Law (1,160 codes)

In addition, there are 253 Anesthesia codes which do not appear in the *Federal Register's* fee scchedule listing. The scope of codes to be studied as part of the practice expense project will include only a subset of the codes designated with status indicators by HCFA; certain classes of codes (defined by their status indicators) will be excluded. For example, it is likely that all codes with status indicator "A" will be included; these are active codes for which separate payment is made. Similarly,

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[1] Except for enteral and parental therapy, durable medical equipment, orthotics, and temporary codes for non-physician services or items.

codes with status indicator "X" will be excluded, since they are excluded from the fee schedule by law. There are other sets of codes for which inclusion and exclusion are less clear. For the preliminary classification work that is displayed in this briefing paper, services with status code D, E, and X (1,731 codes), none of which currently have RVUs, have been excluded from the analysis. The exact specification of status codes to include/exclude, and any exceptions within status code, is an issue to be resolved. In addition to the services finally selected, there are approximately 850 codes that have technical/professional component modifiers. These services will have to have their separate components valued. In addition, services subject to the site of service differential are also likely to be valued for both in and out of office provision.

3.2 CRITERIA FOR SERVICE GROUPING

The services selected for inclusion in the grouping must then be grouped on some basis. As suggested, service families need to have "similar" services. An initial classification system has been developed, using three main criteria. To define "similar" more precisely:

- The codes in each family have relatively comparable direct costs (to facilitate extrapolation);
- The codes within a family are clinically related, to the extent necessary and feasible (to allow for reasonably small CPEPs, and informed discussion among CPEP members);
- Assignment of services to families do not rely on patient or physician-specific factors (so that unique HCPCS code payment rates are defined).

The first criterion requires that each family contain services with *comparable direct costs*. This allows the direct cost measurement for the reference service in each family to be easily extrapolated to the other services in the family, simplifying the measurement process. Since the objective of our analysis is to measure costs, knowing which services have similar costs *a priori* is not simple. However, we address this problem by drawing on previous research which has established the cost relationships between services, and by use of expert opinion in reviewing the families. Each CPEP will have the opportunity to reassign services to different families within

the universe assigned to it, and/or assign adjustment factors to services for the direct cost extrapolation.

The second criterion for forming service families requires that codes within a family are, to the extent feasible, *clinically related*. This criterion is necessary because CPEP participants will need to be familiar with all or most of the services in a family, not just the reference service, in order to evaluate the validity of the results of extrapolation to other services in the family. The assumption of comparable direct cost is also probably stronger, given the sparse data on cost homogeneity, if it is made between clinically-related services. Finally, existing case mix systems that are used to form these service families are based on clinically-related groupings. This does not necessarily imply that the families are oriented strictly along specialty lines, although specialty-based groupings are a likely outcome of the service family groupings for some services.

The third criterion for forming service families requires that assignment to families *does not depend on patient or physician-specific factors*. This is necessary so that the measurement process does not result in separate payment rates for the same service which depend on factors not accommodated by the Medicare RBRVS fee schedule. For example, this precludes using classification mechanisms which use factors such as diagnosis as the primary factor to classify patients, since the RBRVS does not make this distinction in setting payment rates. Similarly, any assignment of services to families based on specialty distinctions is inconsistent with the RBRVS. It will be important, however, to allow for site-of-service distinctions, since the MFS allows for payment differentials based on site-of-service. Redundant assignment of services and/or service families to CPEPs will be made to serve as a check on the CPEP results.

In addition to these criteria, to the extent possible, codes in any one family should either be all performable in an office setting (e.g., simple skin procedures), or all not commonly performed in an office setting (e.g., major neurosurgical services). Ensuring that services requiring separate profiling for in- and out-of-office provision are in the same service family will facilitate extrapolation from reference services to their families, since the resource relationships will be more straightforward if all services in the family either are or are not broken down by site of service.

3.3 CASE MIX SYSTEMS

In order to classify properly all of the services included in the MFS into families meeting the criteria above, we have combined and modified portions of two existing classification systems: The Ambulatory Patient Groups (APG) system developed by 3M, and the Berenson-Eggers-Holahan classification scheme (hereafter BEH). Each system has advantages and disadvantages for establishing the proposed classification system, however, we have taken advantage of the portions of each that are suitable for the service family definition. This combined system will be the starting point for the CPEP-TEG when it meets to define and finalize the classification of services into service families.

The APG system has nine major categories, and 297 total APGs. The nine categories, and the number of APGs in each are as follows:

Significant procedures	145
Medical	80
Lab	23
Radiology	20
Pathology	2
Anesthesia	1
Ancillary tests and procedures	15
Incidental procedures	15
Chemotherapy drugs	3
TOTAL	297

If it is reasonable to assume that physician office practice and hospital outpatient departments have similar *relative* relationships among direct costs across services, then APGs are useful since they were developed with the intent of defining resource and clinical homogeneity for services performed on an outpatient basis. In addition, there are other parts of the APG system that can be useful. For example, the Radiology APGs are based on, first, the type of equipment used; and second, on whether contrast media are used or not. These are both cost-related variables; the first (i.e., equipment) in particular is significant for purposes of assessing appropriate technical component payment rates for particular services. Similar advantages exist for using the other non-

medical APG categories. However, the APG system cannot be used in its entirety for the classification into families because medical APGs are all defined by ICD9-CM diagnosis codes, (after the absence of a procedural service on a claim has been determined). In addition, the single APG for inpatient services is too aggregated.

The BEH classification system of CPT-codes contains slightly over 100 categories, essentially collapsing the CPT codes into a more aggregated typology. This system has the advantages of being based exclusively on CPT-4 codes, including all that are part of the MFS, and having categories that are based on clinically coherent groupings. However, this grouping system is not appropriate for use in its entirety because the clinically related groupings for procedures, tests, and other non-medical services do not have homogeneous or comparable direct practice expenses.

As a general approach, we have created a combined system based on components of both the BEH and APG systems. This system is discussed in detail in section 1.3 below. To develop it, we have performed a comprehensive review of all CPT-4 codes to ensure that all services have been accounted for and have been assigned into service families. We will, in addition, review alphanumeric HCPCS codes for inclusion; less than 30 of these currently have RVUs in the MFS. The results will be reviewed by our clinical consultants, and HCFA clinical staff, and then will be presented to the CPEP-TEG which will have an opportunity to review and critique the service assignment to families. The CPEP-TEG will review the comparability of direct costs within the families, and reassign codes or assign adjustment factors if they believe a service is inappropriately classified into a family.

This approach will result in a final system of service families that are clinically coherent, resource comparable, and not dependent on patient or physician characteristics. We have defined 189 families to date, of which we have assigned 158 to nine CPEPs. There are 31 families for which CPEPs have not yet been formed. As we continue our review of the service codes, the number of families may increase. Some families have a very large number of codes, which may make it difficult for the CPEPs to extrapolate. We will continue to review these, in consultation

with our clinical consultants and HCFA medical staff. The number of additional CPEPs that will be required is likely to be at least three, making the total number of CPEPs at least 12.

The nine CPEPs currently formed have preliminary assignments of between 14 and 25 services. We will also plan to build in redundancy of service families in CPEPs to provide internal validation checks. For example, visit services might be assigned to several CPEPs in order to validate the results obtained. This redundancy will be built in after the CPEPs are finalized, and thus are not reflected in the preliminary results presented here. With built in redundancy of assigning some families to two CPEPs, this will result in an average of approximately 20 codes assigned to each panel, a manageable number of services for a panel to determine direct costs.

4.0 DETERMINATION OF CPEP COMPOSITION AND ASSIGNMENT OF SERVICE FAMILIES TO CPEPs

After the service families are finalized, a set of inter-related issues must be resolved so that the CPEPs may be scheduled and conducted. These issues are:

- Assignment of service families to CPEPs;
- Final determination of the number of CPEPs;
- Identification of the specialty composition of each CPEP.

The final number of the CPEPs and their required specialty representation will be determined primarily by the final service families that are ultimately defined. This in turn, (as described in the preceding section) depends on our refinement of the proposed combined classification system, and the decisions made at the CPEP-TEG meeting that will occur in the early stages of the project.

Determination of a recommended CPEP structure will require refinement of the classification system, as well as significant analysis of BMAD data. We have used Medicare BMAD data to examine the distribution of specialities providing services in each of the families in the preliminary Abt classification system. Below we present data from this preliminary analysis,

and discuss the process that will be applied to finalize the CPEPs and the assignment of service families to each CPEP.

4.1 PRELIMINARY RECOMMENDATIONS

A preliminary analysis of BMAD data identifies potential assignments of service groups to CPEPs and suggests that approximately 12 CPEPs will be necessary, though only nine of these are specifically recommended at this point. It is important to note that the total number of CPEPs is dependent on both the clinical nature of the services and on the size of the individual CPEPs. For example, CPEPs with a large number of members can be assembled if there are "break-out" groups during the CPEP meeting for specific families of services that are known about by only small subsets of the panel members. Assembling CPEPs with a large number of participants implies that fewer CPEP panels would be convened. Alternatively, CPEPs with fewer members can be convened that would focus on fewer service families. This implies that a larger number of CPEPs must be convened.

In defining CPEPs, their panelists, and their service family assignments, there are several issues that must be considered to ensure that the CPEP representation is appropriate and maximally effective. First, other than primary care clinicians who may be included, it is important to minimize the extent to which CPEP members review services with which they are unfamiliar. Second, we would like to minimize the extent to which important providers of a service are not represented on a panel reviewing a service. Third, we plan to construct the panels with sufficient cross-specialty representation to provide internal validation. Fourth, panels must have a reasonable number of services to study, neither too many nor too few. Achieving these objectives requires an examination of the patterns of service provision by specialties. Based on our preliminary analysis, 9 individual CPEPs have been identified, with several more to be defined for service families not yet assigned. Exhibit 1 presents this preliminary assignment of service families to each of the 9 CPEPs, as well as the ungrouped families.

4.2 PROCESS FOR FINALIZATION OF CPEP COMPOSITION

After the CPEP-TEG finalizes the service family classification system, the assignment of each service family to individual CPEPs will be tested by determining the total number of services performed by each specialty in each service family. This analysis will be based on BMAD data. Specialties within each service family will be ranked by volume, until 90% of the volume is accounted for in that service family. This will identify for each service family the "representative specialties." Using a combination of descriptive data analysis and judgement, service families will be clustered such that the overlap across service families of the representative specialties is optimized. Optimality here is somewhat subjective, but depends largely on the ability of the different members of each panel to engage in constructive dialogue to reach a valid consensus. For example, grouping all surgical services together may be sub-optimal if orthopedic surgeons and ophthalmologists have insufficient common experience to reach consensus on the direct costs of different reference services. This analysis will be iterated until reasonable groupings are determined.

Intentional overlap of service families onto panels will also be designed into the assignments to help serve both as an internal validation, and as a way of gaining wider representation from the panel members on services that are common across most of the medical community. For example, a family of basic evaluation and management services might be assigned to panels focusing on Evaluation & Management services and to a panel focusing on surgical services. One reference service will be pre-selected, with input from the CPEP-TEG, for each of these overlap service families. The panels may select an additional reference service from that family if deemed necessary.

Exhibit 1
Summary of CPEP Composition

CPEP #	Type of Services	Provider of Services	No. of Abt Service Families
1	Integumentary and ENT	Dermatology, Podiatry, Otolaryngology, Family Practice, General Surgery, Internal Medicine, Plastic Surgery, General Practice, Audiology, Ophthamology	15
2	Male Genital and Urinary	Nephrology, Urology, Internal Medicine	17
3	Musculoskeletal	Orthopedic Surgery, Podiatry, Rheumatology, Family Practice, Internal Medicine, General Surgery, General Practice, Anesthesiology, Physical Therapy, Neurosurgery	22
4	Female Reproductive	Obstetrics-Gynecology, Urology, General Surgery, Family Practice, General Practice, Surgical Oncology	14
5	Eye	Ophthalmology, Optometry	16
6	Radiology	Radiology, Orthopedic Surgery, Radiation Oncology, Internal Medicine, Family Practice, Cardiology, Ophthalmology, General Practice, Urology, Podiatry, Nuclear Medicine, General Surgery	16
7	Evaluation and Management and other cross-specialty services	Internal Medicine, Family Practice, Cardiology, General Practice, Pulmonary Disease, General Surgery, Ophthalmology, Urology, Gastroenterology, Orthopedic Surgery, Hematology/Oncology, Emergency Medicine, Neurology, Podiatry, Nephrology, Dermatology, Physical Rehab, Psychiatry, Otolaryngology, Obstetrics-Gynecology	14

CPEP #	Type of Services	Provider of Services	No. of Abt Service Families
8	Lower Abdomen and Breast	Gastroenterology, General Surgery, Internal Medicine, Radiology, Colorectal Surgery, Family Practice, General Practice	19
9	Cardiovascular	Internal Medicine, Cardiology, Family Practice, General Practice, Hematology/Oncology, General Surgery, Rheumatology, Urology, Pulmonary Disease, Thoracic Surgery, Cardiac Surgery, Vascular Surgery, Anesthesia	25
Grouping Un-Decided	Allergy, Immunology, Respiratory, Pulmonary, Anesthesia, Nervous System, Psychiatry, Physical Medicine, Pathology, Chemotherapy	Allergy/Immunology, Pulmonary Disease, Internal Medicine, Otolaryngology, Family Practice, Dermatology, General Practice, Cardiology, Psychiatry, Physical Therapy, Neurology, Psychology, Orthopedic Surgery, Physical Rehabilitation, Clinical Social Work, Anesthesia, Pathology, Hematology/Oncology, Dermatology, Urology, Neurosurgery	31

Once the specialties to be included on each panel are determined, the number of representatives from each specialty will depend on the total number of specialties represented and on the relative volumes of services performed by each specialty. For example, a panel with relatively few specialties represented will have more members from each specialty than one with a large number of specialties. Similarly, a panel examining radiology services will have more radiologists than orthopedic surgeons, based on their volumes of performing the service.

Once this process is complete, recruitment of CPEP members can proceed. Abt Associates, in conjunction with HCFA, will work with the Medical Group Management Association (MGMA), the American Group Practice Association (AGPA), and medical specialty societies to identify physicians, non-physician clinician (e.g. nurses) and practice administrators who are knowledgeable about practice expenses for recruitment. Abt has already secured the support of the AGPA to assist in this endeavor. Our subcontractors, the Center for Research in Ambulatory Healthcare Administration (CRAHCA), the research division of the MGMA, and Entermedica will also assist in identifying potential CPEP members. Where possible, we will identify some panelists who are knowledgeable about practice expenses and who have thought about the complexities of calculating service-specific costs. Our experience with these panels indicates that panel members must "climb a learning curve," and that the presence of experienced panel members on the CPEPs will accelerate this learning curve process for the entire CPEP group.

Once the CPEP members have been recruited and assigned to an appropriate panel, the reference services will be finalized and the resource profiles developed. In another briefing paper, we discuss the objectives of the CPEP meetings, the duties the panel members will have and the methodology that will be used to arrive at the resource profiling.

A significant issue that must be resolved related to this combined classification system is defining the set of services for which direct costing will be attempted. For simple ambulatory services which may be performed in either an office or other ambulatory setting, we will cost the service (from the practice's perspective) in both settings. Complex ambulatory services, on the other hand, are often performed in day surgery units and ambulatory surgery centers, and many

of these services are never or rarely performed in an office setting. From the practice's perspective, both an ambulatory procedure performed outside the office and an inpatient procedure are likely to have similar (indirect) practice expense implications. If a specific procedure is never performed in an office setting, then for purposes of classification, we can classify it with inpatient services and not attempt to measure the direct costs associated with office procedures. The large number of procedures only sometimes performed in an office setting represent a significant additional effort to cost directly, yet failing to cost them directly will present a problem in paying physicians when they are performed in the office. At the same time, it may be appropriate to discourage the performance of highly complex services in the office setting. Weighing and resolving these competing considerations for pricing policy is then a prerequisite to decide which services must be costed in both settings.

SUMMARY OF CPEP COMPOSITION BY Abt SERVICE FAMILY

CPEP	Abt SERVICE FAMILY	ASF DESCRIPTION
CPEP #1	INTEGUMENTARY AND ENT	
	34	SIMPLE INCISION AND DRAINAGE
	35	NAIL PROCEDURES
	36	SIMPLE DEBRIDEMENT AND DESTRUCTION
	37	COMPLEX EXCISION, BIOPSY AND DEBRIDEMENT
	38	SIMPLE EXCISION AND BIOPSY
	39	COMPLEX SKIN REPAIRS INCLUDING INTEGUMENT GRAFTS, TRANSFER AND REARRANGEMENT
	40	SIMPLE SKIN REPAIR
	146	COCHLEAR DEVICE IMPLANTATION
	147	OTORHINOLARYNGOLOGIC FUNCTION TESTS
	148	NASAL CAUTERIZATION AND PACKING
	149	COMPLEX FACIAL AND ENT PROCEDURES
	150	SIMPLE FACIAL AND ENT PROCEDURES
	151	TONSIL AND ADENOID PROCEDURES
	152	SIMPLE AUDIOMETRY
	160	SPEECH THERAPY
CPEP #2	MALE GENITAL AND URINARY	
	17	MAJOR PROCEDURE - TURP
	99	RENAL EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY
	100	SIMPLE URINARY STUDIES AND PROCEDURES
	101	URINARY CATHETERIZATION AND DILATATION
	102	COMPLEX CYSTOURETHROSCOPY AND LITHOLAPAXY
	103	MODERATE CYSTOURETHROSCOPY
	104	SIMPLE CYSTOURETHROSCOPY
	105	COMPLEX URETHRAL PROCEDURES
	106	SIMPLE URETHRAL PROCEDURES
	107	HEMODIALYSIS
	108	PERITONEAL DIALYSIS
	109	TESTICULAR AND EPIDIDYMAL PROCEDURES
	110	INSERTION OF PENILE PROSTHESIS
	111	COMPLEX PENILE PROCEDURES
	112	SIMPLE PENILE PROCEDURES
	113	PROSTATE NEEDLE AND PUNCH BIOPSY
	210	RENAL/URINARY TRACT ENDOSCOPY

CPEP	Abt SERVICE FAMILY	ASF DESCRIPTION
CPEP #3	MUSCULOSKELETAL	
	27	HIP FRACTURE REPAIR
	28	HIP REPLACEMENT
	29	KNEE REPLACEMENT
	30	MAJOR ORTHOPAEDIC PROCEDURES
	33	COMPLEX INCISION AND DRAINAGE
	43	COMPLEX MUSCULOSKELETAL PROCEDURES EXCLUDING HAND AND FOOT.
	44	SIMPLE MUSCULOSKELETAL PROCEDURES EXCLUDING HAND AND FOOT
	45	COMPLEX HAND AND FOOT MUSCULOSKELETAL PROCEDURES
	46	SIMPLE HAND AND FOOT MUSCULOSKELETAL PROCEDURES
	47	ARTHROSCOPY
	48	REPLACEMENT OF CAST
	49	SPLINT, STRAPPING AND CAST REMOVAL
	50	CLOSED TREATMENT OF FRACTURE AND DISLOCATION OF FINGER, TOE AND TRUNK
	51	CLOSED TREATMENT OF FRACTURE AND DISLOCATION EXCEPT FINGER, TOE AND TRUNK
	52	OPEN OR PERCUTANEOUS TREATMENT OF FRACTURES
	53	BONE OR JOINT MANIPULATION UNDER ANESTHESIA
	54	BUNION PROCEDURES
	55	ARTHROPLASTY
	56	HAND AND FOOT TENOTOMY
	57	ARTHROCENTESIS AND LIGAMENT OR TENDON INJECTION
	158	OCCUPATIONAL THERAPY
	159	PHYSICAL THERAPY
CPEP #4	FEMALE REPRODUCTIVE	
	18	HYSTERECTOMY
	97	COMPLEX LAPAROSCOPIC PROCEDURES
	98	SIMPLE LAPAROSCOPIC PROCEDURES
	114	ARTIFICIAL FERTILIZATION
	115	PROCEDURES FOR PREGNANCY AND NEONATAL CARE
	116	TREATMENT OF SPONTANEOUS ABORTION
	117	THERAPEUTIC ABORTION
	118	VAGINAL DELIVERY
	119	COMPLEX FEMALE REPRODUCTIVE PROCEDURES
	120	SIMPLE FEMALE REPRODUCTIVE PROCEDURES
	121	DILATION AND CURETTAGE
	122	HYSTEROSCOPY
	123	COLPOSCOPY
	201	MINOR REPRODUCTIVE PROCEDURES

CPEP	SERVICE FAMILY	ASF DESCRIPTION
CPEP #5	EYE	
	10	SPECIALIST - OPHTHALMOLOGY
	133	MINOR OPHTHALMOLOGICAL TESTS AND PROCEDURES
	134	FITTING OF CONTACT LENSES
	135	LASER EYE PROCEDURES
	136	CATARACT PROCEDURES
	137	COMPLEX ANTERIOR SEGMENT EYE PROCEDURES
	138	MODERATE ANTERIOR SEGMENT EYE PROCEDURES
	139	SIMPLE ANTERIOR SEGMENT EYE PROCEDURES
	140	COMPLEX POSTERIOR SEGMENT EYE PROCEDURES
	141	SIMPLE POSTERIOR SEGMENT EYE PROCEDURES
	142	STRABISMUS AND MUSCLE EYE PROCEDURES
	143	COMPLEX REPAIR AND PLASTIC PROCEDURES OF EYE
	144	SIMPLE REPAIR AND PLASTIC PROCEDURES OF EYE
	145	VITRECTOMY
	203	MINOR OPHTHALMOLOGICAL INJECTION, SCRAPING AND TESTS
	206	PROVISION OF VISION AIDS
CPEP #6	RADIOLOGY	
	153	THERAPEUTIC NUCLEAR MEDICINE
	154	RADIATION THERAPY AND HYPERTHERMIA
	155	VASCULAR RADIOLOGY EXCEPT FOR VENOGRAPHY OF EXTREMITY
	156	MYELOGRAPHY
	157	MISCELLANEOUS RADIOLOGICAL PROCEDURES WITH CONTRAST
	162	COMPLEX DIAGNOSTIC NUCLEAR MEDICINE
	163	INTERMEDIATE DIAGNOSTIC NUCLEAR MEDICINE
	164	SIMPLE DIAGNOSTIC NUCLEAR MEDICINE
	165	OBSTETRICAL ULTRASOUND
	166	DIAGNOSTIC ULTRASOUND EXCEPT OBSTETRICAL
	167	MAGNETIC RESONANCE IMAGING
	168	COMPUTERIZED AXIAL TOMOGRAPHY
	169	MAMMOGRAPHY
	170	DIGESTIVE RADIOLOGY
	171	PLAIN FILM
	172	THERAPEUTIC RADIATION TREATMENT PREPARATION

CPEP	Abt SERVICE FAMILY	ASF DESCRIPTION
CPEP #7	EVALUATION AND MANAGEMENT AND OTHER CROSS-SPECIALTY SERVICES	
	1	OFFICE VISITS - NEW
	2	OFFICE VISITS - ESTABLISHED
	3	HOSPITAL VISIT - INITIAL
	4	HOSPITAL VISIT - SUBSEQUENT
	5	HOSPITAL VISIT - CRITICAL CARE
	6	EMERGENCY ROOM VISIT
	7	HOME VISIT
	8	NURSING HOME VISIT
	12	CONSULTATIONS
	20	MAJOR PROCEDURE - OTHER
	32	SUPERFICIAL NEEDLE BIOPSY AND ASPIRATION
	59	NEEDLE AND CATHETER BIOPSY, ASPIRATION, LAVAGE AND INTUBATION
	80	PHLEBOTOMY
	196	INFUSION THERAPY EXCEPT CHEMOTHERAPY
CPEP #8	LOWER ABDOMEN AND BREAST	
	14	BREAST PROCEDURES
	15	COLECTOMY
	16	CHOLECYSTECTOMY
	41	SIMPLE INCISION AND EXCISION OF BREAST
	42	BREAST RECONSTRUCTION AND MASTECTOMY
	82	DEEP LYMPH STRUCTURE AND THYROID PROCEDURES
	85	ALIMENTARY TESTS AND SIMPLE TUBE PLACEMENT
	86	ESOPHAGEAL DILATION WITHOUT ENDOSCOPY
	87	ANOSCOPY WITH BIOPSY AND DIAGNOSTIC PROCTOSIGMOIDOSCOPY
	88	PROCTOSIGMOIDOSCOPY WITH EXCISION OR BIOPSY
	89	DIAGNOSTIC UPPER GI ENDOSCOPY OR INTUBATION
	90	THERAPEUTIC UPPER GI ENDOSCOPY OR INTUBATION
	91	LOWER GASTROINTESTINAL ENDOSCOPY
	92	ERCP AND MISCELLANEOUS GI ENDOSCOPY PROCEDURES
	93	HERNIA AND HYDROCELE PROCEDURES
	94	COMPLEX ANAL AND RECTAL PROCEDURES
	95	SIMPLE ANAL AND RECTAL PROCEDURES
	96	MISCELLANEOUS ABDOMINAL PROCEDURES
	205	TUBE CHANGE

SUMMARY OF CPEP COMPOSITION BY Abt SERVICE FAMILY

CPEP	Abt SERVICE FAMILY	ASF DESCRIPTION
CPEP #9	CARDIOVASCULAR	
	21	CABG
	22	ANEURYSM REPAIR
	23	THROMBOENDARTERECTOMY
	24	CORONARY ANGIOPLASTY
	25	PACEMAKER INSERTION
	26	OTHER CARDIOVASCULAR PROCEDURES
	65	EXERCISE TOLERANCE TESTS
	66	ECHOCARDIOGRAPHY
	67	PHONOCARDIOGRAM
	68	CARDIAC ELECTROPHYSIOLOGIC TESTS
	69	PLACEMENT OF TRANSVENOUS CATHETERS.
	70	DIAGNOSTIC CARDIAC CATHETERIZATION
	71	ANGIOPLASTY AND TRANSCATHETER PROCEDURES
	72	PACEMAKER INSERTION AND REPLACEMENT
	73	REMOVAL AND REVISION OF PACEMAKER AND VASCULAR DEVICE
	74	MINOR VASCULAR REPAIR AND FISTULA CONSTRUCTION
	75	SECONDARY VARICOSE VEINS AND VASCULAR INJECTION
	76	VASCULAR LIGATION
	77	RESUSCITATION AND CARDIOVERSION
	81	BLOOD AND BLOOD PRODUCT EXCHANGE
	84	TRANSFUSION
	197	CARDIOGRAM
	202	MINOR CARDIAC AND VASCULAR TESTS
	204	PACEMAKER ANALYSIS
	207	INTRODUCTION OF NEEDLE AND CATHETER

CPEP	Abt SERVICE FAMILY	ASF DESCRIPTION
		GROUPING UNDECIDED
	13	ANESTHESIA
	31	PHOTOCHEMOTHERAPY
	58	PULMONARY TESTS
	60	COMPLEX ENDOSCOPY OF THE UPPER AIRWAY
	61	SIMPLE ENDOSCOPY OF THE UPPER AIRWAY
	62	ENDOSCOPY OF THE LOWER AIRWAY
	64	RESPIRATORY THERAPY
	83	ALLERGY TESTS
	195	SIMPLE PULMONARY FUNCTION TESTS
	200	SIMPLE IMMUNIZATION AND ALLERGY IMMUNOTHERAPY.
	9	SPECIALIST - PSYCHIATRY
	19	MAJOR PROCEDURE - EXPIOR/DECOMPR/EXCIS DISC
	124	EXTENDED EEG STUDIES
	125	ELECTROENCEPHALOGRAM
	126	ELECTROCONVULSIVE THERAPY
	127	NERVE AND MUSCLE TESTS
	128	NERVOUS SYSTEM INJECTIONS, STIMULATIONS OR CRANIAL TAP
	129	REVISION AND REMOVAL OF NEUROLOGICAL DEVICE
	130	NEUROSTIMULATOR AND VENTRICULAR SHUNT IMPLANTATION
	131	NERVE REPAIR AND DESTRUCTION
	132	SPINAL TAP
	161	NEUROPSYCHOLOGICAL TESTING
	999	? INCLUSION UNDETERMINED ?
	78	CHEMOTHERAPY BY EXTENDED INFUSION
	79	CHEMOTHERAPHY EXCEPT BY EXTENDED INFUSION
	173	COMPLEX PATHOLOGY
	174	SIMPLE PATHOLOGY
	178	SIMPLE IMMUNOLOGY TESTS
	184	SIMPLE CHEMISTRY TESTS
	193	URINALYSIS
	209	AUTOPSY SERVICES

Data Collection and Analysis for Generating Procedure-Specific Practice Expense Estimates

HCFA Contract No. 500-95-0009

Briefing Paper #6

Procedure-Specific Data Collection: CPEP Protocol Design/Implementation

May 24, 1995

Abt

Abt Associates Inc.

Prepared by Abt Associates Inc.

1.0 OVERALL OBJECTIVES OF CLINICAL-PRACTICE EXPERT PANELS (CPEPs)

In briefing paper #5, we discuss the process for defining Clinical Practice Experts Panels, (CPEPs), and the method of assigning services to individual CPEPs for developing through a small-group consensus approach, reliable data for generating service-specific direct cost estimates. This requires the CPEPs to perform the following primary functions:

- Evaluate and refine Abt's preliminary classification of services into resource- and clinically-homogenous groups to maximize the extent to which the resulting service groupings (or families) will facilitate the estimation of service-specific direct costs;
- Identify representative reference services from each group and develop detailed profiles of the resources required to provide these services; and
- Apply the reference service resource profiles to the remaining codes in each family to produce direct cost estimates for the more than 8,500 CPT codes and HCPCS services on the Medicare Fee Schedule.

The CPEP Technical Expert Group (CPEP-TEG), an oversight and planning group for all CPEP activities, will review the preliminary categorization of services developed by Abt and identify several candidate reference services from each family. Two separate panel meetings with the individual CPEPs will subsequently be convened to collect additional data for developing the per-service direct cost estimates.

The first CPEP meeting will be held to determine the resource inputs, including the clinical and administrative staff time and medical supplies and equipment, required to perform these reference services within a physician office setting, compared to other settings (e.g. free-standing ambulatory surgery center, hospital inpatient, or hospital outpatient setting). These service-level resource requirements will form the basis for estimating the direct costs associated with the remaining CPT and HCPCS services on the fee schedule. A second CPEP meeting will be convened to provide panel members with estimates of the direct costs for the reference services discussed during the first meeting. CPEP members will review these cost estimates and extrapolate these costs to the other services within each family. These direct cost estimates will subsequently be combined with indirect cost estimates, developed by Abt, to produce total practice

cost estimates for each service. The CPEP members will be asked to validate these total cost values to ensure that they adequately reflect the resources required in the provision of each service. The process by which these panels will be conducted and the specific tasks of the CPEP-TEG and the CPEPs are discussed below.

2.0 APPROACH TO PANEL PROCESS

As described in briefing paper #5, the CPEPs will be organized by Abt project staff, who will be responsible for preparing instructional materials for the panels, mailing these materials to panel members, and collecting and summarizing information obtained at the CPEP meetings. The instructional materials will explain the objectives and process of each CPEP and define relevant terms related to Abt's strategy for collecting data on practice expenses.

A small-group consensus approach will be used to obtain from each panel the data necessary to produce the service-specific direct cost estimates. This technique will provide panel members with the opportunity to discuss openly the vital elements of the service-specific data collection strategy: finalization of service groupings, identification of appropriate reference services, development of reference service resource profiles, and extrapolation of these profiles to the more than 8,500 CPT codes and HCPCS services. A senior staff member from Abt Associates will be responsible for moderating each panel and guiding the discussions to ensure that consensus is achieved on each of these issues. In the course of conducting these panels, the Abt moderator will function to resolve any initial differences of opinion by helping panel members to identify the source of disagreement and to come to a compromise on the issues in question. In addition, at least one other staff member from Abt Associates will attend each panel meeting to record and compile the information discussed during each CPEP.

The composition and formulation of the CPEPs will be the cornerstone of this consensus-building process. As explained in briefing paper #5, Abt will carefully select CPEP members who have sufficient knowledge of practice expense issues and assign them to the CPEPs so that there is adequate cross-representation of different specialties on each panel. This will facilitate CPEP

members' ability to engage in constructive dialogue and to reach agreement on the questions that will be posed to them.

3.0 SPECIFIC FUNCTIONS AND SCHEDULING OF CPEPs

In this section, we explain the specific functions of the CPEP-TEG and the individual CPEPs and how these panels will operate to

- finalize the service families;
- select reference services from each family;
- establish resource profiles for each reference service;
- review the reference service direct cost estimates derived from the resource profiles; and
- apply the reference service direct cost estimates to the remaining codes in each family to produce direct cost estimates for the remaining CPT codes and other HCPCS services on the Medicare Fee Schedule.

The use of a "mock" CPEP to test the feasibility and efficacy of collecting service-specific data through a panel process is also discussed. In addition, the CPEPs' role in validating the final service-specific cost estimates (representing the sum of the direct and indirect costs) is described.

Exhibit 1 provides a list of the activities associated with each CPEP and the anticipated schedule for their completion. Abt staff will effectively prepare CPEP members for each of these tasks to ensure that they understand and complete each activity according to the timeframe identified below.

Exhibit 1: Schedule of CPEP Activities

Activity	CPEP-TEG	Ballot to CPEPs	"Mock" CPEP	1st CPEP Meetings	2nd CPEP Meetings	Mail Review
Establish final service groupings	Jul '95					
Select candidate reference services	Jul '95					
Finalize reference services		Aug '95				
Test CPEP process for developing resource profiles			Sep '95			
Develop final resource profiles for reference svcs.				Oct '95 - Dec '95		
Review reference service direct costs					Mar '96 - May '96	
Rate services in each family relative to reference service (extrapolation)					Mar '96 - May '96	
Validate procedure-specific cost estimates						Sep '96

3.1 ROLE OF THE CPEP-TEG IN FINALIZING SERVICE GROUPS AND IDENTIFYING CANDIDATE REFERENCE SERVICES

As indicated in Exhibit 1, the CPEP-TEG will be convened during the month of July to assess the preliminary service groupings developed by Abt. Prior to this meeting, the results of Abt's analysis, including a comprehensive list delineating the service families, and a complete description of our methodology will be sent to the CPEP-TEG members. They will be asked to review this information in preparation for the CPEP-TEG meeting and to evaluate the comparability of direct costs and clinical homogeneity of the services within each family. During the panel meeting, CPEP-TEG members will be asked to discuss their findings and to recommend reassignment of codes to different groups if they believe a service has been inappropriately classified. The Abt moderator will confirm panel consensus on these recommendations before incorporating any revisions into the classification scheme. The results of this process will be a set of service families that are clinically coherent, resource comparable, and not dependent on patient or physician characteristics. Once the service groups are finalized, the CPEP-TEG will select from each family candidate reference services that will undergo subsequent detailed analysis by the individual CPEPs.

Creating a CPEP-TEG for the sole purpose of finalizing the service groups for CPEP assignment optimizes the use of the individual CPEPs by allowing each CPEP to focus their activities purely on resource profiling. Moreover, the activities of the CPEP-TEG in organizing the codes into resource- and clinically-homogenous families and identifying candidate reference services should facilitate CPEP members' ability to extrapolate the reference service resource profiles to the remaining services in each family by making it easier for panel members to gauge differences across services. The efficiencies gained by convening a separate panel for service group selection and development of CPEP methodology outweigh the time and burden placed on holding 12-15 separate CPEP meetings to accomplish the same task as one meeting of the CPEP-TEG.

3.2 Development of Worksheets to Collect Data on Resource Usage and Convening of "Mock" CPEP to Test Efficacy of Worksheets

Abt's approach to conducting the individual CPEP meetings involves utilizing standardized worksheets which are used to summarize information on the resources required to provide each reference service. The use of these worksheets will ensure that the information collected on resource usage for these services is complete and consistent across services and CPEPs.

Examples of these worksheets are included in Attachment A. As illustrated in these examples, five separate worksheets will be used to obtain estimates on the inputs used in performing each reference service (i.e., procedures or evaluation and management services) in a physician office or non-physician office setting (i.e., ambulatory surgery center, hospital inpatient, or hospital outpatient setting):

- Worksheet A1: **Non-physician clinical staff time** required for *procedures*;
- Worksheet A2: **Non-physician clinical staff time** required for *evaluation and management (E&M) services*;
- Worksheet A3: **Administrative staff time** required for *procedures and E&M* services;
- Worksheet A4: Medical **equipment requirements**; and
- Worksheet A5: Medical **supply requirements**.

To facilitate the estimation of staff time requirements, worksheets A1-A3 list general activities, such as chart retrieval, that are typically associated with the provision of various procedures and E&M services to ensure that when panel members report their time estimates, they account for the different tasks executed by each of their non-physician practice staff. These activities are divided into three distinct service periods: the time before a service is actually performed (pre-service period), the time when the service is actually performed (intra-service period), and the time after the service is performed (post-service period). The worksheets require CPEP members to report the type and number of non-physician clinical staff (e.g., registered

nurses, licensed practical nurses) who are involved in performing activities *directly* related to patient care and the type and number of administrative staff (e.g., scheduling secretaries, insurance/billing personnel) who perform other functions (e.g., patient scheduling, insurance verification) *indirectly* related to the service. CPEP members are asked to record the time (in minutes) that each of these staff spend on each of the listed activities. The delineation of staff type will enable Abt staff to determine the appropriate wages to apply to these time estimates when calculating the direct costs for each service.

As noted above, the worksheets have also been designed to collect data on the supplies and equipment necessary for providing the services (worksheets A4 and A5). In order to estimate the costs of the equipment associated with the provision of a particular service, worksheet A4 asks for data on the type of equipment used; the number of minutes the equipment is used for each reference service; the total hours it is used per week by the practice for any service; the number of weeks it is used per year by the practice; its purchase price and useful life; and the annual maintenance costs (including "downtime"). The worksheet also asks CPEP members to indicate the specific brand and model number of each type of equipment. Practices use a wide variety of equipment, with different capabilities and costs, in providing services to patients. Therefore, detailed information on the brand and model of the equipment is necessary in order to determine the proper purchase price, useful life, and annual maintenance costs to incorporate into the calculation of the total equipment costs associated with each service.[1] In some cases CPEPs may provide alternative brand/models with corresponding descriptive data. In this case, the panel will be asked to develop the appropriate "average" equipment description.

Before convening the first round of CPEP meetings, the data collection worksheets and the CPEP process will be assessed by convening a "mock" CPEP for one day which will be similar in composition to the CPEP-TEG, consisting of clinicians from several different specialty groups.

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[1] Abt project staff plan to collect additional data on the purchase price, useful life, and annual maintenance costs of equipment from major manufacturers and large group purchasing organizations. These data will be compared with the estimates provided by the CPEPs. Therefore, equipment descriptions, including brand names and model numbers, will be needed to obtain such data from these alternative sources.

Abt project staff will meet with the group during September, one month before the first CPEPs, to discuss all of the activities that will take place at these panels.

Abt will work with members of this mock panel to test the efficacy of the worksheet design and the feasibility with which the worksheets can be used to collect reliable data. Prior to the meeting, each member of the mock panel will be sent copies of each of the five worksheets, including directions for their completion. Using these worksheets, they will be asked to develop resource profiles for a limited number of the reference services selected from the different service families and to identify any difficulties they experience while completing them.[2] The mock CPEP will then provide Abt staff and members of this panel with an opportunity to discuss and resolve the limitations of the worksheets.

As noted previously, the reference service resource profiles will be applied to the other services within each family to produce direct cost estimates for all of the remaining services on the fee schedule. Therefore, the mock panel will also consider issues in extrapolating estimates of resource use to other services within each family to determine the ease with which panel members can make these extrapolations. Finally, at the conclusion of this meeting, mock panel members will be asked to review the CPEP process and to offer recommendations as to how it could be improved.

Following the "mock" CPEP meeting, Abt staff will revise the worksheets and other aspects of the CPEP process, as necessary, in consultation with HCFA to incorporate the comments of panel members. Final arrangements for the actual CPEP meetings will then be made.

3.3 FIRST CPEP: DEVELOP REFERENCE SERVICE RESOURCE PROFILES

The first CPEP meetings will be held to develop the detailed resource profiles for each reference service that will form the basis for calculating direct cost estimates for the approximately

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[2] To the extent that the results of the ballots for selecting final reference services have been tallied, the mock CPEP will be asked to complete the worksheets for a subset of these services. Otherwise, Abt staff, in conjunction with HCFA, will identify, from the list of candidate reference services nominated by the CPEP-TEG, a small group of services for which the mock panel will develop resource profiles.

8,500 CPT codes and HCPCS services on the fee schedule. As described previously, Abt anticipates that approximately 250 service families will be identified that will be organized into approximately 10-15 CPEPs. Each CPEP will be assigned 15-25 service groups, resulting in an average of about 20 reference codes being assigned to each panel for development of resource profiles.

Prior to convening the first CPEPs, a "ballot", which contains the candidate reference services for each family identified by the CPEP-TEG, along with Medicare volumes and other useful data for each service, will be mailed to CPEP members during the month of August. They will be asked to select the one code from each group that is most representative of the services in that family. The ballots will be tabulated to determine which reference service within each group is deemed to be most representative.

Once the reference services have been finalized, the CPEPs will determine the resource inputs required to perform these services. Before the meetings, Abt staff will send to each CPEP participant the final list of reference services which have been selected from the families assigned to that panel, as well as copies of each of the five worksheets, and instructions for their completion. CPEP members will be ***required*** to complete the worksheets and provide all of the relevant data ***prior*** to the CPEP meeting. Abt staff will subsequently compile these data and will prepare tables presenting the entire distribution of the data (e.g., mean, median, minimum, and maximum) for use during the meeting. Panel members will be asked to review these results and to determine which summary of the data most accurately reflects the typical resources required in providing these services, using the consensus process described above.

With panels of this type, participants tend to contribute more during the meeting when the material is structured and supported by data which can be confirmed or disputed. The panel's prior exposure to the methodology through completion of the worksheets and the compiled results will provide a useful starting point for discussions. Panelists will be assured that they are not constrained by the summary statistics; rather, these data are intended to facilitate initial discussion by overcoming any difficulties imposed by a "blank piece of paper."

3.4 SECOND CPEP: EXTRAPOLATE REFERENCE SERVICE DIRECT COST ESTIMATES TO OTHER SERVICES

In preparation for the second meeting of each CPEP, Abt will collect estimates of the input prices (i.e., nurse wages and supply prices) specified in the resource profiles for each reference service. These prices will be applied to the data on resource usage provided by the CPEPs to derive direct cost estimates for each reference service.

The second panel meeting will begin with discussion of these direct cost estimates to ensure that they accurately reflect the consensus of the panel. Once the CPEPs have verified the reliability of the direct cost estimates for the reference services, these cost estimates will be extrapolated to the other services within each family. The extrapolation process will require panel members to rate the services within each group relative to the reference service for the family. This will result in each service being assigned a unique rating that represents the ratio of the direct cost for the service in question to the direct cost for the reference service. These ratings, or "adjustment factors", can then be multiplied by the direct cost of the reference service to produce direct cost estimates for all of the other codes in the family. For example, a service-specific adjustment factor of 2.0, combined with a reference service direct cost of $50, results in a direct cost of $100. Similarly, if an adjustment factor of 1.0 is assigned, the direct cost of the service would be the same as that for the reference service. The proposed classification system, which is intended to group services according to resource- and clinical-homogeneity, should facilitate this extrapolation exercise.

4.0 VALIDATION OF SERVICE-SPECIFIC PRACTICE COST ESTIMATES

The CPEP process, involving carefully structured panels of knowledgeable physicians, administrators and clinical practice staff, combined with the implementation of a tested, standardized worksheet to collect resource profiles and sound data on input prices, should result in relatively straightforward estimates of service-specific direct costs for the more than 8,500 CPT codes and HCPCS services on the Medicare Fee Schedule. In order to develop total service-specific practice cost values, these estimates will need to be combined with indirect cost estimates

for each service. However, a variety of indirect cost estimates are likely to be developed based on different indirect cost allocation strategies.[3] In order to determine which allocation methodology and payment approach produces service-specific practice cost estimates that accurately reflect the resources required in providing these services, it will be necessary to subject these cost estimates to a final round of review.

The CPEP members, who will be familiar with the methodology and data used to develop these initial cost estimates, will be instrumental in this review phase. Following the extrapolation of direct costs and assignment of overhead costs to each service, a list of the estimated per-service direct costs and alternative indirect and total service-specific practice costs (representing the sum of the direct and indirect costs) for a subset of the universe of codes will be sent to each CPEP member.

Redundant assignment of services will be built into this review process, with each code being examined by at least two CPEP members. CPEP members will be asked to consider the different indirect cost estimates resulting from the application of each allocation strategy and assess which approach produces the most accurate per-service indirect cost estimates. In addition, they will perform a final check on the direct cost estimates, focusing particularly on the cost relations across services. In order to expedite this review process, Abt will include a faxable form to return that will enable respondents to indicate which indirect cost values effectively capture the overhead costs associated with the provision of a particular service and to identify direct cost values for which they believe a problem exists. In cases where there is disagreement on the appropriate cost value to use for a service, Abt will enlist the assistance of the CPEP members through conference calls and the support of clinical consultants to the project. The result of this

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[3] Abt staff plan to assess a number of indirect cost allocation methodologies that have been recommended by several researchers including: the cost function approach in which indirect costs are allocated using statistical regression; methods which allocate indirect costs based on the physician work and/or direct costs associated with a service; the step-down approach which allocates different categories of indirect costs according to different rules (e.g., space is allocated based on time, while billing is assigned uniformly across all services); and methods which calculate a pre-set aggregate payment based on practices' characteristics.

process will be a single set of total service-specific practice costs that accurately reflects the differences in the resources required to provide the CPT codes and other HCPCS services on the MFS.

ATTACHMENT A

Worksheet A1 : Time Spent (in Minutes) by Non-Physician Clinical Staff for Procedures Performed in Physician Office and Other Setting[4]

	CPT #					
	Physician Office Setting			Other Setting ____		
Activity	Staff Type[5]	# of Staff Used	Total Minutes Spent by Each Staff on Each Activity	Staff Type	# of Staff Used	Total Minutes Spent by Each Staff on Each Activity
Pre-Procedure Period:						
Provide patient's pre-op visit						
Education/instruction						
Reception/gowning						
IV						
Room prep						
Move and position patient						
Intra-Procedure Period:						
Sedate/topical anesthesia						
Perform procedure						
Post-Procedure Period:						
Move patient						
Recovery/discharge						
Clean room/equipment						
Follow up phone calls						
Nursing form						
Provide post-op visits						

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[4] "Other setting" refers to free-standing ambulatory surgery center (ASC), hospital inpatient, or hospital outpatient setting.

[5] Non-physician clinical staff are those staff who are *directly* involved in the provision of a particular service. Types of non-physician clinical staff may include: registered nurses (RNs), licensed practical nurses (LPN), nurse practitioners, physician assistants (PAs), and technicians (e.g., x-ray, ultrasound, lab technician). If your practice uses other types of non-physician clinical staff that are not listed above, please indicate their full title in the space provided.

Worksheet A2 : Time Spent (in Minutes) by Non-Physician Clinical Staff for Evaluation and Management Services Performed in Physician Office or Other Setting

	CPT # ____________					
	Physician Office Setting			Other Setting ____________		
Activity	Staff Type[6]	# of Staff Used	Total Minutes Spent by Each Staff on Each Activity	Staff Type	# of Staff Used	Total Minutes Spent by Each Staff on Each Activity
Pre-visit Period:						
Retrieve patient						
History and vital signs						
Room prep						
Intra-visit Period:						
Assist M.D.						
Record notes						
Post-visit Period:						
Counseling/instructions						
Diagnostic medical forms, lab slips, X-ray requisitions, prescriptions						
Clean room/equipment						

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[6] Non-physician clinical staff are those staff who are ***directly*** involved in the provision of a particular service. Types of non-physician clinical staff may include: registered nurses (RNs), licensed practical nurses (LPNs), nurse practitioners, physician assistants (PAs), and technicians (e.g., x-ray, ultrasound, lab technician). If your practice uses other types of non-physician clinical staff that are not listed above, please indicate their full title in the space provided.

	CPT # ______					
	Physician Office Setting			Other Setting ______		
Activity	Staff Type[7]	# of Staff Used	Total Minutes Spent by Each Staff On Each Activity	Staff Type	# of Staff Used	Total Minutes Spent by Each Staff On Each Activity
Pre-Procedure Period:						
Scheduling						
Remind patient of visit						
Register patient, assemble/develop chart						
Obtain records						
Pre-certify patient						
Verify insurance, review coverage						
Manage/recall patient database						
Pre-procedure billing						
Phone contact with referring M.D.						
Post-Procedure Period:						
Transcription of results, prepare letter to M.D.s						
Schedule post-op or return visits						
File/manage records						
Bill collecting/rebilling						
UR/QA						
Post-certification						
Admin. tasks associated with readmission						
Phone contact with referring M.D.						

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[7] Administrative staff oversee the non-medical aspects of the practice; they ***do not*** provide direct patient care. Examples of administrative staff include: receptionists, medical and scheduling secretaries, insurance/billing personnel, medical records personnel, office managers/administrators.

Worksheet A4 : Medical Equipment Requirements

CPT #

Equipment Requirements: Below, please indicate the equipment used in the above procedure, the time it is used, purchase price, useful life, and annual maintenance costs.

Type of Equip.	Equip. Description (e.g., brand and model #)	Total Minutes Used	Total Hrs Used/Week	Total Wks Used/Year	Purchase Price	Useful Life (in Yrs)[8]	Annual Maintenance Costs
					$		
					$		
					$		
					$		
					$		
					$		
					$		
					$		
					$		
					$		
					$		
					$		
					$		

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[8] Useful life refers to the time period in which a particular piece of equipment can be used in the provision of a service before it must be replaced.

Worksheet A5 : Medical Supply Requirements

CPT #

Supply Requirements: Below, please list supplies, which are used in the provision of the service and which ***are not*** separately billable.

Item description	Quantity	Unit Price
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________
__________	Number used = __________	$__________

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HCFA Contract No. 500-95-0009

Briefing Paper #7

Analysis Objectives and Research Database

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1.0 INTRODUCTION

This paper discusses how data collected by Abt Associates will be used to develop service-specific estimates of practice expenses under the Medicare Fee Schedule. These estimates will be resource-based and will incorporate information both from the CPEP meetings and from the survey of individual practices. The data collected as part of his study will also be used to develop a database that other researchers can use.

There are three fundamental issues related to the estimation of practice expenses:

- How to estimate direct costs of performing a small set of high-volume reference services and then extrapolate these costs to the full set of service codes;
- How to measure the indirect costs of practices and allocate these costs to individual services. By their definition, indirect costs are not readily assignable to specific services, but rather represent overhead costs that are shared among services; and
- How to distinguish practice expenses for a service according to the site where the service is provided.

This paper discusses each of these three issues and approaches to addressing them It concludes with a brief discussion of how the impact of changing reimbursement for practice expenses will be assessed.

2.0 ESTIMATION AND EXTRAPOLATION OF DIRECT COSTS

This project will develop estimates of practice expenses for each of more than 8,500 HCPCS codes covered by the Medicare Fee Schedule. Our approach to costing these services will be to classify all codes into approximately 250 families of services, within which individual services have comparable direct costs. The CPEPs will (in their first meeting) then work to enumerate the resources associated with performing a high-volume reference service within each service family. This enumeration of resources will include the amount of time of (non-physician) clinical and administrative staff associated with performing the service, attendant supply requirements, and usage of equipment. These resource profiles will form the basis of estimating the direct costs of each reference service.

Before the second CPEP meeting, the direct cost of each reference service will be estimated by costing the amount of each input identified by the CPEP. For example, the cost of the time of nurses required for a service patient will be determined by multiplying time for all activities of registered nurses associated with the service (e.g, preparing the patient) by the cost to the practice of purchasing this time (i.e., wage and fringes). For example, if a half an hour of an RN's time is required for a service and these nurses typically earn $30 an hour (with fringes), we would value RN time for the service at $15. We will similarly value supplies associated with a service, along with the value of using equipment that can be associated with the service.[1]

At their second meeting, the CPEPs will be asked to extrapolate the estimated direct costs of reference services to other services within service families. The direct costs for these other services will equal the estimated direct cost for the reference service, times an adjustment factor to be developed by the CPEP. For those services that have the same direct costs, the adjustment factor will be 1.0. For a service that has direct costs that are half of those of the reference service, the adjustment factor will be 0.5. CPEP discussions at the second set of meetings will focus on how to estimate these adjustment factors.

Once the CPEPs develop adjustment factors, it will then be possible to estimate the direct cost of each service on the Medicare Fee Schedule. This, along with the indirect costs allocated to the service (the estimation of which is discussed below), will form the basis of the estimate of total practice expenses for each individual service.[2]

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[1] Determining the cost of using equipment to perform a specific procedure is a relatively complex task. Equipment is durable and the costs of purchasing, maintaining, and using equipment must be considered over its lifetime. In addition, a given piece of equipment can often be used to perform more than one procedure so that its costs must be allocated across procedures.

[2] In algebraic notation, the total practice costs (TPC) of a single practice (denoted by the subscript j) can be written as:

$$TPC_j = IC_j + DC_j$$

3.0 COMPUTATION AND ALLOCATION OF INDIRECT COSTS

The indirect costs of a physician's practice are those costs that cannot readily be assigned to specific services. These include some "general" indirect costs such as office rent that are common to all services and must be assigned to all services. There are also "service-specific" indirect costs that could include equipment or space dedicated to performing certain services. To estimate practice costs for reimbursement purposes, it will be necessary first to estimate the total indirect cost of the physician practice and then to allocate these costs to specific services. The data on indirect costs of practices will be derived from the survey of practices that will collect information on the different components of practice expense. This survey will also collect information on the volume and mix of cases that a practice treats which will allow us to allocate these costs to given services among those practices that perform the services. This will result in a range of estimates of indirect cost per-service (resulting from variability in costs of practices) from which it will be necessary to pick a "typical" value of indirect cost across practices (such as the mean or median) that can be used in computing practice expenses.

There are two ways to compute the total indirect cost of a practice. The first is to compute indirect costs as the difference between the total and direct costs of the practice. Under this approach, the volume and mix of services performed by the practice (which will be available from the survey of practices) is combined with the estimates of direct cost per service that will be developed by the CPEPs. Subtracting the resulting estimate of total direct costs from the total practice costs results reported on the survey provides an estimate of total indirect costs for a practice. A second approach is to rely on financial data from the survey and simply estimate the total indirect cost of each practice by summing the components of indirect cost.

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where IC_j and DC_j are respectively the total indirect and direct practice costs for the jth practice. The total direct costs of a practice will be:

$$DC_j = \Sigma_i DC_{ji}Q_{ji}$$

where DC_{ji} is the direct cost to the practice of performing procedure i and Q_{ji} is the number of times that procedure i is performed by practice j.

We will use both approaches to calculate indirect costs and compare the resulting estimates. We will then compare the two sets of estimates and, if necessary, reconcile them. There are two ways to reconcile differences between estimates of indirect costs. The first is to scale the estimate of service-specific direct costs derived from the CPEP activities so that they match the estimates of aggregate total direct costs (and its complement, indirect costs) derived from the survey. The second approach makes no adjustment to service-specific direct costs, but rather adjusts the estimates of indirect costs to match the estimate of direct cost derived from the service-specific direct costs.

In comparing estimates of indirect costs under both methods, it will be necessary to explore whether differences in estimates are uniform across all practices, or whether the differences are largest among certain practice (e.g., small practices, practices that are part of a larger institution). This examination of characteristics of practice may suggest reasons why estimates systematically differ for some practices and may suggest strategies for reconciling estimates for these practices.

Once we have developed an estimate of the total indirect costs of the practice, it will be necessary to allocate these costs to specific services for the practice.[3] There are a number of different approaches which can be used to allocate these costs. An extreme approach is to simply divide the practice's total indirect costs by the number of services it performs as an estimate of service-specific indirect costs. This assumes that indirect costs are constant for all services within a practice. Alternative approaches assume that indirect costs vary across services and are correlated with service-specific factors such as direct practice costs, physician work, or physician

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[3] Formally, the allocation process will assign the indirect costs of the jth practice ($IC_{j)}$), to each of the service codes (denoted i) produced by the practice and exactly exhaust indirect costs over the output produced by the practice. Defining A_{ji} as the allocation factor for practice j and service i and Q_{ji} as the number of time procedure i is performed by practice j, we can write the allocation of the practice j's total indirect costs to service code i as:

$$IC_{ji} \quad = \quad (IC_j * A_{ji})/Q_{ji}$$

so that

$$IC_j \quad = \quad \Sigma_{i=1}^{n} IC_{ji}Q_{ji}$$

time. As an example, let us assume that indirect costs of a service are proportional to its direct practice costs. If indirect costs are 40 percent of total practice expenses (and direct costs therefore 60 percent of total practice expenses), we would estimate that indirect costs were two-thirds (i.e., 40 percent/60 percent) of estimated direct costs for a given service. The approaches to estimating service-specific indirect costs described above involve allocating data for each practice's total indirect practice expenses across the services it performs. For each service, variability in the total indirect costs across practices will result in a range of estimated indirect costs for that service. As a result, there will be a distribution of service-specific indirect costs for each service. It will be necessary to estimate a "middle" value of indirect cost such as the mean or median of this distribution that can be used in setting practice expense rates.

A major concern in using data from a survey of practices to compute service-specific estimates of indirect costs is that many services will be performed by only a few practices in the sample, or may be performed only a few times by a large number of practices.[4] It will be necessary to take care to assure that estimates of indirect costs of these services are reasonable. To identify low-volume services, we will apply a threshold such as fifty or more sampled practices performing the service at least five times in a year. For services that fall below this threshold, we will calculate service-specific indirect costs as described above, but then check to make sure that the estimate of these costs are reasonable.[5]

To determine if calculated indirect costs are reasonable for low-volume services, we will define a standard by which these costs can be compared. The standard will be defined as the percentage change in practice expense payment implied by the direct and indirect cost estimates

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[4] BMAD data suggest that a relatively small number of procedures account for a large share of total procedure volume (e.g., 222 procedures account for 90 percent of volume under Medicare, excluding laboratory and anesthesia procedures).

[5] Part of the analysis of the survey data will be to determine the number of sampled practices that perform different procedures and the frequency with which these procedures are performed. This information will be used to determine if setting alternative thresholds would significantly affect the number of procedures that are considered to be "low-volume".

for the services in the same service family relative to the current MFS payment. For each low-volume service, we will therefore compare the implied percentage change in practice expense payment for the service to the changes in payment for other (higher-volume) services in the same service family. If estimated percentage change in payment for a low-volume service falls inside of a cutoff range (e.g., within one standard deviation of the mean percentage change in payment for services within the service family), then the estimate of indirect costs for the low-volume service will be used as originally estimated.

If the practice expense for a service is outside of the cutoff range, the indirect cost amount for the service will be adjusted so that the change in practice expense payment for the service is equal to the median change for the services in the same family. This re-estimated indirect cost amount will replace the estimated value derived directly from the indirect cost estimates for that service.

Regression methodology provides an alternative approach to estimating indirect costs. This statistical approach relates total estimated indirect costs of a sample of practices to the volume of different groups of services that they perform. Regression methodology estimates an equation of the form:

$$IC_i = \beta_1 X_{1i} + \beta_2 X_{2i} + + \beta_3 X_{3i} + \dots \beta_n X_{ni}$$

where IC_i is the total indirect costs of a practice and the Xs (of which there are n) are quantities of the number of times that a service is performed (the subscript i refers to the fact that these costs and quantities are for individual practices).[6] The β's in the equation are an estimate of how the total indirect costs of a practice are expected to change if it performs a given service (or a service

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[6] The X variables can be defined both in terms of type of procedure performed and also the site at which the service is performed. As such, it provides a relatively easy approach to measuring differences in indirect costs across different sites of service if this data is available.

within a group of services) an additional time. In this respect, each β estimates the indirect cost of performing the service X with which it is associated.[7]

Regression methodology is relatively easy to implement, given that the survey of practices will collect data on their casemix. It will provide a very useful complement to the allocation services described above and will provide an independent method of verifying estimates obtained through allocation. In the regression equation presented above, it very easy to lump together different services into groups and then estimate how performing services in that group affect indirect costs. It also will allow us to lump together relatively low-volume services into groups rather than trying allocate indirect costs to each service. In addition, regression methodology can be used to separately examine the individual components of indirect practice expense (such as equipment costs) to estimate how these should be assigned to different groups of services.

4.0 ESTIMATING PRACTICE EXPENSES BY SITE OF SERVICE

As part of the development of resource profiles for reference services (and the extrapolation of these profiles to other services), the CPEPs will be asked to consider differences in the use of resources that are supplied by the practice across different sites of service (office vs. all other sites). It is expected that practice expenses (from the physician's perspective) outside of the office in that other instituions such as a hospital will provide some of the administrative and clinical staff, along with supplies and equipment.

The Medicare program currently incorporates differences in (non-physician) costs by practices across different sites of service in two ways. First, it separates out a professional compoents from a technical component for some services performed outside of the physician's office such as radiology. Second, the Medicare program makes a "site of service" adjustment

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[7] Strictly speaking, true indirect or joint cost will not vary with any of the outputs. This type of regression approach will (when run with no intercept term) expend indirect cost (as unearned) across services. It could also be used to define indirect cost if run with an intercept.

for listed services provided in a non-office setting that reduces practice expense reimbursement by one half below the reimbursment for services provided in the office.

The resource profiles that are developed by site of service will form the basis for estimating site-of-service differentials (and for assessing the adequacy of Medicare's current method of reducing practice payment payments by site of service). They will facilitate measurement of practice expense differentials across sites and to more precisely set reductions in practice expense reimbursement across sites for different services.

Ideally the survey of practices would collect data on casemix by site of service. This would allow us to estimate directs costs associated with services at different sites and to allocate indirect costs across these sites. We believe, hoever, that collection of these data would be burdensome to practices and could significantly reduce the response rate for our survey. We will instead ask practices to provide data on the overall share of different types of services (e.g., evaluation and management, consults, surgery) that are provided in different settings. These percentages can be used to approximate casemix by site of service and provide a general indication of the allocation of costs across settings.

5.0 IMPACT ANALYSIS

The analyses conducted in this project will be used by HCFA to set values of the practice expense component of the Medicare Fee Schedule. Although these values will be budget neutral in the aggregate, changes in the values from the current payment system will necessarily lead to changes in reimbursement for individual services and for groups of services. In addition, changes in the practice expense component of the fee schedule will also lead to changes in reimbursement to different types of physician practices, including practices of different size, of different specialty, and in different locations (e.g., region, urban/rural). As part of this project, it will be necessary to assess the distributional impact of changes in the practice expense component of the fee schedule.

An important issue in coordinating such an analysis is the conversion of the cost data collected in the project to budget-neutral relative value units. Abt Associates will work with HCFA Staff to determine the conversion required to accomplish budget neutrality.

The casemix data and information on practice characteristics that is collected as part of the survey of practices can be used to assess the impact of changes in the fee schedule relative values on different types of practices. The casemix data can be used to compute reimbursement both under current policy and under alternative policies. Since casemix data will not be collected by source of payment, it will be necessary to assume that other payers have similar reimbursement to Medicare's. Given a set of service-specific reimbursements, we will be able to compare the reimbursement for practice expenses to the level of practice costs by type of practice. This will allow HCFA to assess the equity of payment changes across practices and specialties.

One important issue to be addressed in the impact analyses is the adequacy of reimbursement for practices in areas that may be underserved, such as those in rural areas or in inner cities. Another consideration affecting the political acceptability of the payment reform is the extent to which changes in the fee schedule will affect the income of different medical specialties.

In addition to assessing the impact on fee schedule changes on the distribution of reimbursements, the data we collect will be used to calculate the effects of these changes on the overall level of Medicare expenditures. For this analysis, we will use BMAD data on the volume of different services currently performed. This will allow HCFA to assess whether a given set of practice expense values are budget neutral and to assess how changes in volumes or mix of services will affect total Medicare expenditures.

An important component of the impact analysis, both in terms of distribution of reimbursement and in terms of overall Medicare expenditures, will be to assess how different policies and assumptions affect reimbursement. There are a number of issues that can be examined with the data that will be available. These include (as examples) the effects of using different methods to allocate indirect costs, of using different assumptions in valuing equipment and of adopting various site-of-service differentials.

6.0 RESEARCH DATABASE

A key objective of this practice expense project is to produce publicly available data which can be used by other researchers. To provide full flexibility in this regard, the data files that we will provide to HCFA fall into three categories:

- Raw data files;
- Intermediate analytic files; and a
- Final analytic file.

The following outline is a preliminary review of the contents and structures of these files. The data layouts included are suggestive and will be modified as key decisions are made during the course of the project. For example, as the practice survey is finalized, so too will the data elements of the Practice-Specific Survey file be finalized. In addition, as alternative methodologies are analyzed, variables specific to these methodologies will be added to the analytic files.

6.1 RAW DATA FILES

There will be four raw data files, each derived directly from all data collection activities.

- **Practice-Specific Survey File**
  This file will contain all of the practice-specific survey information collected for all of the practices, except for the casemix information, which will be handled separately in the *Casemix File*, described below. The details of the anticipated layout of this file are based on the draft survey instrument contained in Attachment 1 in Briefing Paper #3 which discusses the survey instrument design and implementation. Since the survey instrument has yet to be finalized, the ultimate contents of this file have not been determined. An example record layout for this file is presented in Exhibit 1.

- **Casemix File.**
  This file will contain the primary casemix data collected from the surveyed practices. This data will consist of a five-digit HCPCS code (over 8,500 valid codes) and a frequency of the procedure for each practice. Data will be reported separately for services billed with professional components and as global services.

The number of observations will depend on the number of HCPCS reported by each practice. An example record layout for this file is presented in Exhibit 2.

- **Direct Input Prices**
  This file will contain the prices for the all direct inputs. Since the set of direct inputs will be determined in consultation with the CPEPs, the exact number of inputs is not yet known. This is also true for the number of different sources for the direct input prices. The data for this file will be derived from a variety of sources including the practice-specific survey, CPEP panels, and secondary sources. An example record layout for this file is presented in Exhibit 3.

- **Reference Service Direct Inputs.**
  For each reference procedure/site-of-service combination, this file will contain information as to how much of each direct input is needed to perform the service. The TEG and CPEP-TEG will help determine the set of reference services and sites-of-service (physician office, other setting) to be studied. As discussed in Briefing Paper #5, which discusses the classification system and CPEP formulation, we expect that there will be direct input estimates for approximately 250 services for two types sites-of-service settings (e.g., physician office, other setting) for each procedure. Data will be derived from the CPEP meeting results. An example record layout for this file is presented in Exhibit 4.

6.2 INTERMEDIATE ANALYTIC FILES

Several intermediate files will be constructed prior to the finalization of the Final Analytic file.

- **Reference Service Direct Costs.**
  This file will contain direct cost estimates for each of the reference procedure/site-of-service combinations considered by the CPEPs. It is expected that there will be about 250 reference procedures, with up to four or five possible sites-of-service. For each procedure, the direct cost estimate will be computed by multiplying each of the direct input prices (from the **Direct Input Prices** file) by the appropriate direct input coefficient for the procedure (from the **Reference Service Direct inputs** file), and summing the results. If multiple cost estimation methods or direct input prices are used, this file will contain multiple direct cost estimates. An example record layout for this file is presented in Exhibit 5.

- **Extrapolated Service Direct Costs.**
  This file will contain one or more direct cost estimates for every valid HCPCS service/site-of-service combination, as extrapolated from the data in the **Reference Service Direct Costs** file. The file will also contain the parameters used in the extrapolation process(es), information from the existing Medicare Fee Schedule, and additional descriptive information, such as the most recently reported annual Medicare volume and allowed charges. An example record layout for this file is presented in Exhibit 6.

- **Practice-Specific Estimated Cost File.**
  This file will contain direct, indirect and total cost estimates for each of the surveyed practices. Direct, indirect and total costs will be reported in the survey. Direct costs will also be calculated based on the practice's casemix and the procedure direct cost estimates in the **Extrapolated Service Direct Costs** file. Calculated indirect and total costs will be found by subtracting the calculated direct cost from the reported total cost. An example record layout for this file is presented in Exhibit 7.

6.3 FINAL ANALYTIC FILE

One final analytic file will incorporate data from all primary data collection activities as well as data from the intermediate analytic files.

- **Service-Specific Practice Expense Estimates.**
  This file will contain the final service-specific direct and indirect cost estimates for each valid HCPCS/site-of-service combination. The direct costs will be taken from the **Extrapolated Service Direct Costs** file, while the indirect costs will be calculated using different methodologies. This file will also contain the parameters used for the indirect costs estimates, as well Medicare Fee Schedule information and reported Medicare annual volume and charge data. An example record layout for this file is presented in Exhibit 8.

Exhibit 1
Practice Specific Survey File

Field	*Field Type*	*Description*
PRAC_ID	Character	The practice's unique identification number
Section 1. Direct Patient Care Costs		
Q1_1a	Date	Response to first survey item in Section 1
Q1_1b	Date	Response to second survey item in Section 1
⋮	⋮	⋮
Q1_4	Numeric	Response to last survey item in Section 1
Section 2. Indirect Costs		
Q2_1	Numeric	Response to first survey item in Section 2
Q2_2	Numeric	Response to second survey item in Section 2
⋮	⋮	⋮
Q2_8	Numeric	Response to last survey item in Section 2
Section 3. Practice Information		
Q3_1a1	Numeric	Response to first survey item in Section 3
Q3_1a2	Numeric	Response to second survey item in Section 3
⋮	⋮	⋮
Q3_12	Character	Response to last survey item in Section 3
Section 4. Practice Casemix Data		
This information will be maintained separately in the *Casemix File*.		
Section 5. Practice Identification Information[8]		
MDNAME	Character	Physician/Practice name
RESPNAME	Character	Respondent's name
TEL	Character	Respondent's phone number
FAX	Character	Respondent's FAX number

Number of variables = # of survey items + 1
Number of observations = 3,000
Unit of observation = surveyed practice

In order to maintain survey respondent anonymity, practice identification information will be provided to HCFA in a scrambled format.

Exhibit 2
Casemix File

Field	*Field Type*	*Description*
HCPCS	Character	Five-digit HCPCS procedure code
MODIFIER	Character	Global-Professional
PRAC1	Numeric	Number of times this procedure was performed by the first surveyed practice
⋮	⋮	⋮
PRAC3000	Numeric	Number of times this procedure was performed by the 3,000th (last) surveyed practice

Number of variables = 3,002
Number of observations = the number of HCPCS service code
Unit of observation = HCPCS service code

Exhibit 3
Direct Input Price File

Field	*Field Type*	*Description*
INPUT	Character	Identifies the direct input
PRICE1	Numeric	Price from first source
⋮	⋮	⋮ prices from all other sources
PRICE*n*	Numeric	Price from last source
MEAN	Numeric	Mean price across all sources
MEDIAN	Numeric	Median price across all sources

Number of variables = maximum # of sources + 1
Number of observations = # of inputs
Unit of observation = direct input

Exhibit 4
Reference Service Direct Input File

Field	*Field Type*	*Description*
HCPCS	Character	Five-digit HCPCS service code
SITE	Character	Site-of-service code (physician office, other setting)
INP1	Numeric	Quantity of first direct input
⋮	⋮	⋮ quantities of all other direct inputs
INP*n*	Numeric	Quantity of last direct input

Number of variables = # of inputs + 2
Number of observations = # of distinct reference procedure/site-of-service combinations
Unit of observation = site-of-service/reference service

Exhibit 5
Reference Service Direct Cost File

Field	*Field Type*	*Description*
HCPCS	Character	Five-digit HCPCS service code
SITE	Character	Site-of-service code
DC1	Numeric	Direct cost estimate, first method
⋮	⋮	⋮ direct cost estimates for all other methods
DC*n*	Numeric	Direct cost estimate, last method

Number of variables = # of direct cost estimation methods + 2
Number of observations = # of distinct reference service/site-of-service combinations
Unit of observation = site-of-service/reference service

Exhibit 6
Extrapolated Service Direct Cost File

Field	*Field Type*	*Description*
HCPCS	Character	Five-digit HCPCS procedure code
SITE	Character	Site-of-service code (physician office, other setting)
Direct Cost Estimates		
DC1	Numeric	Direct cost estimate, first method
⋮	⋮	⋮ direct cost estimates for all other methods
DC*n*	Numeric	Direct cost estimate, last (*n*th) method
Medicare Fee Schedule Information		
WORK	Numeric	Medicare Work RVUs
PEXP	Numeric	Medicare Practice Expense RVUs
MALP	Numeric	Medicare Malpractice RVUs
TOTAL	Numeric	Medicare Total RVUs
UPDATE	Character	Medicare Fee Schedule update indicator (Surgical/Non-surgical/Primary care)
Other Medicare Information		
VOLUME	Numeric	Medicare annual procedure volume
ALLWCHGS	Numeric	Medicare annual procedure allowed charges

Number of variables = # of direct cost estimation methods + 9
Number of observations = # of distinct HCPCS service/site-of-service combinations
Unit of observation = HCPCS service/site-of-service

Exhibit 7
Practice-Specific Estimated Cost File

Field	*Field Type*	*Description*
PRAC_ID	Character	The practice's unique identification number
CALCDC1	Numeric	Calculated direct cost (first set of DC estimates)
⋮	⋮	⋮ calculated direct costs using other direct cost estimates
CALCDC*n*	Numeric	Calculated direct cost (last set of DC estimates)
SRV_DC	Numeric	Direct cost from survey
SRV_IC	Numeric	Indirect cost from survey
SRV_TOT	Numeric	Total cost from survey
CALCIC1	Numeric	Estimated indirect cost based on first calculated direct cost
⋮	⋮	⋮ est'd indirect costs based on other calc'd direct costs
CALCIC*n*	Numeric	Estimated indirect cost based on last calculated direct cost
Additional descriptive information from survey ...		
SPECIAL	Character	Specialty
REGION	Character	Geographic region
DRFTE	Numeric	FTE physicians
⋮	⋮	⋮

Number of variables = 3 + 2× (# of direct cost estimation methods) + # of additional survey itmes
Number of observations = 3,000
Unit of observation = surveyed practice

Exhibit 8
Service-Specific Practice Expense Estimates

Field	*Field Type*	*Description*
HCPCS	Character	Five-digit HCPCS procedure code
SITE	Character	Site-of-service code
Direct Cost Estimates		
DC1	Numeric	Direct cost estimate, first method
⋮	⋮	⋮ direct cost estimates using other methods
DC*n*	Numeric	Direct cost estimate, last method
Indirect Cost Estimates		
IC1	Numeric	Indirect cost estimate, first method
⋮	⋮	⋮ indirect cost estimates using other methods
IC*m*	Numeric	Indirect cost estimate, last method
Parameters used in indirect cost estimates...		
RATIO1	Numeric	Physician work allocation
RATIO2	Numeric	Physician work + direct cost allocation
RATIO3	Numeric	Direct cost allocation
⋮	⋮	⋮
Medicare Fee Schedule Information		
WORK	Numeric	Medicare Work RVUs
PEXP	Numeric	Medicare Practice Expense RVUs
MALP	Numeric	Medicare Malpractice RVUs
TOTAL	Numeric	Medicare Total RVUs
UPDATE	Character	Medicare Fee Schedule update indicator (Surgical/Non-surgical/Primary care)
Other Medicare Information		
VOLUME	Numeric	Medicare annual procedure volume
ALLWCHGS	Numeric	Medicare annual procedure allowed charges

Number of variables = 9 + # Indirect Cost Estimates + # Direct Cost Estimates + # IC Parameters
Number of observations = # of distinct HCPCS service/site-of-service combinations
Unit of observation = HCPCS service/site-of-service

Technical Expert Group (TEG) Members: Data Collection and Analysis for Generating Procedure Specific Practice Expense Estimates

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Sally McCue, M.H.A. ***	Managing Associate	Center for Health Policy Studies
Henry Miller, Ph.D.	President	Center for Health Policy Studies
Gregory Pope, Ph.D.	Senior Economist	Health Economics Research
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Emmett Templeton, M.D., F.A.C.R.	Chairman, Board of Chancellors, Baptist Medical Center Montclair, Department of Radiology, Birmingham, AL	American College of Radiologists
Stephen Zuckerman, Ph.D.	Principal Research Associate	Urban Institute

* Substituted for Martin Hickey, M.D., M.S. during second meeting of TEG.

** Substituted for Jim Rodgers, Ph.D. during second meeting of TEG.

*** Substituted for Henry Miller, Ph.D. during second meeting of TEG.

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American Association of Neurological Surgeons
Robert Florin, MD
Whittier Neurosurgical Medical Group
Whittier, CA

American College of Cardiology
Anthony DeMaria, MD
Chief, Division of Cardiology
USCD Medical Center
San Diego, CA

American College of Emergency Physicians
Kenneth DeHart, MD
Grand Strand General Hospital
Emergency Department
Myrtle Beach, SC

Clinical Practice Expert Panel-Technical Expert Group (CPEP-TEG) Attendees

American College of Radiology
Clark Davis
Austin Radiological Association
Austin, Texas

American College of Rheumatology
Ronald Kaufman, MD, MBA
Los Angeles County-USC Medical Center
Los Angeles, CA

American College of Surgeons
Ramona Penland-Coyle, CMM
Mid-Ohio Surgical Associates, Inc.
Columbus, OH

American Medical Association
Glenn Littenberg, MD
Pasadena, CA

Amercian Osteopathic Association
Nancy Edwards
American Osteopathic Association
Payor Relations
Chicago, IL

American Podiatric Medical Association
Harold Glickman, DPM
Podiatric Medicine and Surgery
Washington, DC

American Society of Anesthesiologists
William Schlotter
Capitol Anesthesiology Associates, PA
Austin, Texas

American Society of Gastrointestinal Endoscopy
Gayle Mahan, RN
Gastrointestinal Associates
Knoxville, TN

Clinical Practice Expert Panel-Technical Expert Group (CPEP-TEG) Attendees

American Society of Internal Medicine
Ronald Ruecker, MD
Internal Medicine Subspecialty Associates, Ltd.
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